RAILROAD GAZETTE

FRIDAY, MAY 22, 1896.

CONTENTS

Contributions.

The Southern California Harbor.

WASHINGTON, D. C., May 18, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your item on Southern California Harbors [page 344], you state that the work at Santa Monica or San Pedro, as it is to be located by the Board, is not to cost over $2,900,000. The maximum amount is $3,098,000. Otherwise the item is correct. C.

The Largest Cargo Carried on the Lakes.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the issue of May 15, on page 345, is an item stating that the cargo of 4,860 net tons of ore taken from the Escanaba by the Coralia was the largest cargo ever carried on the Lakes. This is an error, as in October, 1894, the S. S. Curry took 5,117 net tons of ore from Escanaba to South Chicago, and this still remains the largest cargo of any kind ever carried before. H. E. SCHMUCK.

Train Resistance and Momentum Grades.

PHILADELPHIA, May 16, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In justice to Mr. Vaughan, I desire to state that I misapprehended the rule he gave for the rating of empty cars, and that the extra resistances for them in my letter to you of April 3 [*Railroad Gazette*, April 10, p.245.], are incorrect. They should be 4.8 lbs. per ton on a 0.5 per cent. grade, and 13.4 lbs. per ton on a 2 per cent. grade. These figures still show, however, that the rule needs modification according to the grade to which it is to be applied. JOHN MARSTON, JR., C. E.

Observations of a Signal Engineer.

BALLYSHANNON, Ireland, April 25, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Ten years of active service on American railroads increases one's appetite for observation and comparison, and some of my first impressions on my return may be interesting to you.

The rails in general use on the Irish lines are the same in section as the American rails, but a few of the more prosperous lines are partly laid with rails of the English pattern, double-headed. In general the Irish lines are paying well at the present time, but it will take some years to replace the numerous old-fashioned cars on some roads.

The new trains, and in fact the new appliances, in general, are of the latest approved design. I could hardly realize I was in the same Ireland which I knew 15 years ago, when, standing on the platform of the new station at Dundalk, which is a model of neatness and utility, I saw a Belfast express come in, with flashing electric lights and parlor, saloon and dining cars.

There is another change since my previous visit to Ireland; the interlocking electric staff and tablet apparatus is taking the place of the old staff and ticket for single line working, and it is appreciated by both officers and men. There is, as you know, a large proportion of single line in the Emerald Isle. Only one wire is used for the staff instruments, and sometimes this wire also serves a telephone, operated through condensers placed between the 'phone and the earth plate.

Of late the Sykes system of blocking has received impetus in England, which together with the adoption of green for all clear, by the Board of Trade, forms about the only item of consequence since my absence in America. There is little doubt that both these matters would have received attention long ago, but for the fact that the signalmen and drivers are carefully trained and have a great sense of responsibility.

One peculiarity of English practice is the great variety of design in locomotives, bridges, etc., and the marked differences between one line and another. There appears to be nothing like a P. R. R. standard over here, although there is the L. & N. W., which is noted for its standards.

Various syndicates are making a heroic fight, against the opposition of vested interests, in the attempt to push the electric trolley system of street cars, but with the exception of one or two installations, they have had little success thus far. The few electric light plants I have seen appear to be thoroughly well designed. I may mention the fact that there is a tendency to abandon the direct coupled dynamo and engine.

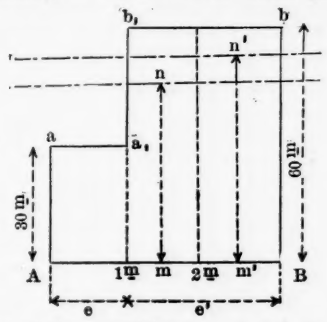
There are signs that the electric track circuit is beginning to find favor over here. In the infant days of the locomotive, track circuit was experimentally tried in England and abandoned, but there is a revival of interest since the reported recent success of the scheme in America, and I am informed that the electrical departments of several roads are making experiments on their own account. There are several difficulties in the way of track circuit in England. For instance, a great many car wheels have wooden webs. Then there is the practice of banking the ballast above the tops of the sleepers. These obstacles can, of course, be surmounted, and I am free to confess myself a convert to the track circuit as successfully worked out in America, in so far as its combination with manual operation of switches and signals is concerned. ARTHUR H. JOHNSON.

A Rapid Transit Problem.

Compagnie du Chemin de fer du Nord,
PARIS LA CHAPELLE, May 6, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Having many opportunities of interpreting the diagrams relating to the conditions of running trains, and more particularly the speed curves, I was much interested in the article in your issue of April 17, 1896, entitled "A Rapid Transit Problem." I take, however, the liberty of calling your attention to a theoretical error in it. It is said, namely, at the end of the second paragraph:



"The area of the parallelogram, *A a b B*, equal to the area enclosed by the two curves and the base *S*, divided by the base *S*, namely, 1, 2 represents the mean speed attained." The length, 1, 2 – page 266— does not represent the mean speed, however, between the the stations *A B*, unless the times and not the spaces be considered as abscisses on the diagram.

Let us take a numerical example. Given a train running over (1) a space, *e*, of one mile, at a speed of 30 miles per hour; (2) a space, e^1, of two miles, at a speed of 60 miles per hour. The time of passing over the distance *e* will be $\frac{1 \times 60}{30} = 2$ minutes; and for e^1, $\frac{2 \times 60}{60} = 2$ minutes; whence the time of passing over $e + e^1$ will be 4 minutes. By definition, the mean speed of this train over the space *A B* = 3 miles will be $\frac{3 \times 60}{4} = 45$ miles per hour = $m\,n$.

Let us now divide the area $Aa\ a_1\ b_1\ bB$ by the base *A B*, considered as distance, we have $\frac{30 \times 1 + 60 \times 2}{3} = 50$ miles per hour = $m^1\ n^1$. Let us now suppose that the lengths *e* and e^1 represent times, we have $e = 2$, $e^1 = 2$. If we divide the area $Aa\ a_1\ b_1\ bB$ by the base *A B*, considered as time, or 4 minutes, we have $\frac{30 \times 2 + 60 \times 2}{4}$ = 45 miles. Therefore the graphical method employed would only be correct by taking the times and not the spaces as abscissas. A. RODRIGUE, *Ingénieur.*

Specifications for Freight Cars.

Missouri, Kansas & Texas Railway System,
ST. LOUIS, MO., May 13, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read the article in your paper of May 1, 1896, concerning specifications. I do not know whether the particular case which you say was considered about 18 months ago referred to the specifications of the Missouri, Kansas & Texas Railway or not, but in any event it was in the market about that time for 2,000 freight cars. The articles enumerated tally so nearly with the specifications that it may be that the criticisms contained in this article were intended to apply to our business methods.

In our case the specifications were only a part of the transaction with the car builders who were invited to bid. The specifications were accompanied by a proposal from the company laying down the rules under which bids would be considered, and the character of the contract they would be required to enter into. One of the important features of this proposal reserved the right to the company to furnish any of the material specified, if it elected to do so, and required the bidder to state the sum he would credit the company on each item if the company elected to furnish the specified article or any substitute therefor, and there was no restriction as to the company's securing special discounts on specified materials. This placed it within the power of the company to negotiate with the vendors of the specified articles and to substitute material of other makers in the event of satisfactory prices not being obtained, and while it is undoubtedly true that there is scarcely any item entering into the construction of a car that is not covered by several devices of equal merit, the object of only specifying one was to avoid the risk of a combination on price, and to also leave the company free to negotiate.

The facts are, in this case the company furnished the car builders a portion of the specified material, and owing to the conditions then existing, secured on every item specified very considerable reductions under current prices then prevailing, and the competition of vendors whose materials were not specified was invited. These negotiations were conducted by our purchasing department, and their results were entirely satisfactory to the company, and from our standpoint had two advantages over what you term "open specifications." First, the company secured that class of material which, after careful investigation, we were satisfied would produce the best results; and, second, we secured those materials at minimum cost.

Regarding the statement of the Superintendent of Motive Power, who writes: "The chances are that the specifications are drawn up with boodle and favoritism behind them," or, in other words, from dishonest motives, it would seem that if there are any manufacturers or dealers in railroad equipment or supplies who would enter into a conspiracy with the officials of a railroad company, they would also betray those officials when it best served their purpose to do so; and without entering into a discussion as to the integrity of managing railroad officials as a class, it would seem that any such official who would place his reputation at the disposal of the dishonest supply agent would be lacking in ordinary intelligence. It is also safe to assume that all of the larger corporations are provided with a business organization by which the various departments are a check upon each other, and as dishonest methods could only be the result of collusion between a number of persons, "boodle and favoritism" are quite improbable.

THOS. E. PURDY,
Vice-Pres't. & Gen'l Manager.

[In writing on this subject 18 months ago we did not refer to the case of the Missouri, Kansas & Texas. We wrote of a railroad then in the hands of receivers. The article will be found in our issue of Dec. 7, 1894, page 838.—EDITOR RAILROAD GAZETTE.]

The Joint Traffic Association's Defense.

A condensation of the argument of the Government in the suit to dissolve the Joint Traffic Association was given in the *Railroad Gazette* of May 15, page 334. The principal argument for the defense was that of James C. Carter and Lewis Cass Ledyard, counsel for the Association. Hon. Edward J. Phelps spoke for the New York Central, but aside from this the individual roads merely declared their approval of the defense made by the Association. The arguments were presented in court chiefly by Mr. Carter, and we now give a synopsis of his brief, which, however, is not very brief, filling 153 pages.

In a preliminary statement of 20 pages the general relation of railroads to the public and the philosophy of the laws and other expressions of public policy that have shaped the progress and history of railroads in the United States are set forth. The manner in which franchises were originally granted made the railroad business free to all, with the fullest possible competition. Under our system, railroads being built by private enterprise, we have had good service and, on the whole, reasonable rates. The only serious complaints for a long time have been of discrimination between persons and places, and instability of rates. These evils have been very difficult to deal with; the early reports of the Interstate Commerce Commission are quoted from at length to show the intricacies of the problem. The most rational method of curing some of the evils of the railroad rate question, as laid down by the Interstate Commerce Commission, are set forth, and it is averred that the Joint Traffic Association was formed with the full purpose of carrying out such methods.

Mr. Carter's argument has seven heads. The first holds that the court has no jurisdiction unless it can be found in some statute, and it is declared impossible to find such a law. It has been uniformly held that courts of equity have no jurisdiction to prevent an illegal act merely because it is illegal. The complaint in the present case alleges nothing except the mere violation of the law and the intent to continue it. Under the second head it is denied that the anti-trust act applies. The third denies any offense against the Interstate Commerce law even if the agreement were one of the acts prohibited by the fifth section. Pooling is made a penal offense, and, as shown under the first head, an injunction should not be granted in such a case. Moreover, a suit can be

instituted only by the District Attorney on request of the Commission, but it is not stated that such request has been made. Again, the Commission should not apply to the District Attorney until it has exhausted its own very express and particular powers, which were conferred upon it for the very purpose of avoiding the necessity of going to the court. With what propriety can the Commissioners compel other public officers to punish the railroads by force when there is a peaceful method, specially prescribed in their law, which they have not tried? If the Commission may rightfully take such action as this, it could, at any time, punish one of several offending carriers and let all the others go free. Surely, the law cannot have intended to give the Commissioners such discretion. They cannot rightfully argue that there was no need of an investigation; the law requires them to investigate, even though the task be extremely easy.

Under the fourth head, the anti trust act (July 2, 1890) is held to be too indefinite and uncertain to apply. That act is a purely penal statute, and the rule of rigid construction is applicable. Following this rule we find that any contract restraining interstate commerce, in any degree, is made unlawful; but, by all precedents, the *degree* of restraint is what must decide the question of lawfulness. Congress could not have intended to make criminal the most common transactions of life, but yet this is as clearly described in the statute as the acquiring of a monopoly by executory contract, and if the one act is punishable under it the other must be.

5. But even if the anti-trust act were definite, it has no application to railroad companies. Looking at the circumstances attending its passage, we find that the mischief it was designed to remedy was something entirely outside the business of a common carrier. Traffic associations were common and well known, and this law would have mentioned them if they had been in the minds of its makers. Congress had dealt with the railroad question three years before, and it is fair to assume that if it had been desired to change the policy of the Government toward the railroads the change would have been definitely made. Finally, the records of the proceedings of the conference committees between the Senate and House show that amendments designed to include railroads were definitely proposed and definitely rejected.

6. But even if the anti-trust act applied, the Joint Traffic Association is not condemned by it. The act deals only with that class of contracts known at the common law as contracts in restraint of trade, and void as such. If the Government seeks to have the agreement declared invalid because it effects *some* restraint on trade, without regard to the extent or character of the restraint, it cannot maintain its point. The only question open for discussion is whether the agreement, in spite of its declared purpose, still has effects which are against public policy. There is no recognized doctrine declaring illegal all contracts which might restrain trade. It is not the mere existence of restraint, but its character and extent which render a contract illegal. In all cases where the end sought to be obtained is found to be just and reasonable, and the means adopted not calculated to injure public interests, it has been held that there is no ground of public policy which should abridge the freedom of making contracts.

Now, does the Traffic Association unreasonably restrain commerce? What is competition? Not wholly a matter of prices; competition in prices benefits only the customer; competition also includes the question of the quality of the goods or of the service rendered; competition in prices is beneficial only until it reduces the profits to the level of profits obtained in business in general. The desirable condition is that where an approach as near as practicable is made to an equilibrium of profits throughout all industries. An agreement between competitors to increase prices above this equilibrium is contrary to a sound public policy, but one to prevent the unnecessary and mischievous destruction involved in cutting prices below a fair profit is not.

It is not, as some think, always impossible to find the line of equilibrium. In the Trans-Missouri Freight Association case (58 Fed. Rep., 58) the decision was in favor of the Association, because the objects of the parties to it were found to be unobjectionable. There was no purpose to stifle healthy competition. Chief Justice Redfield says, in his work on the Law of Railroads, that there is no principle of public policy which renders void a traffic arrangement between two lines for the purpose of avoiding competition. There can be no public policy of the United States unless it be found in a law of Congress, or unless it is, at least, universally agreed to. Congress has not forbidden any agreements except such as amount to pooling. If all contracts restricting competition had been deemed injurious they would certainly have all been prohibited by the Interstate Commerce law. The agreement certainly is lawful upon its face Wherein is there any presumption of guilty intent? The

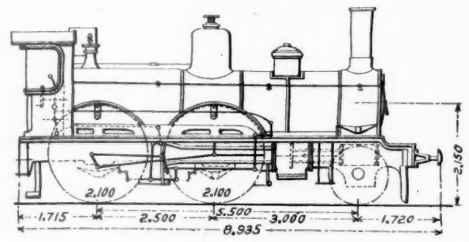


Fig. 1.—Four-Cylinder Compound Locomotive No. 701 —Northern Railway of France.

answer made by the defendants declares the innocence of the agreement and the complainants have not filed a replication on that point.

Mr. Carter then goes on to describe the conditions in the railroad service which led to the agreement. Competition by cutting of rates between railroads is necessarily war, while competition in offering the best facilities is entirely consistent with harmonious action. The law requires rates to be published; but competition is so sharp and active that a railroad cannot hold its own in the strife, even when it publishes new tariffs as frequently as the law allows, and it is forced to disregard the law requiring publication. It is conceded that the published tariffs had for a long time before the present agreement been secretly cut.

The agreement authorized the managers to recommend alterations in rates, but only such as should be just and reasonable. The recommendations are to be only temporarily binding, and any company can disregard them and adopt its own rates, and thus carry on active competition with all other roads, in or out of the association; and all this without retiring from the agreement. The agreement insists that competition shall be fair and open, no independent action to be taken by a road except by a resolution of its board of directors. A member can even engage in unlawful, secret and ruinous competition by retiring from the agreement, which it can do at a loss of only about $5,000.

The arguments presented under the foregoing heads sufficiently defend the agreement against illegality. But the Association should not be merely tolerated—it deserves high commendation. The necessity for harmonious agreement between the roads was very great and the losses from lack of harmony were enormous. Here the argument quotes at length from the early reports of the Interstate Commerce Commission, most of them from the pen of Judge Cooley, describing the intricacies of railroad competition, the evils of inharmonious action, and the great need of regulations which could be agreed to by all the roads in the country. An effective agreement is never possible except between parties at peace with each other. Railroad competition is so pitiless and destructive that it necessarily involves a resort to unfair, dishonest and unlawful means. In the defense of life, if all means are not justifiable they will at least be employed. To require the publication of rates, telling the traffic manager to always inform his competitor beforehand what he is going to do, is like requiring the general of an army to inform his adversary at what point and with what force he purposes to make his next attack. Deadly competition between railroads always begins by a real or suspected *secret* cutting of rates, and is instantly followed by a corresponding secret cutting by all other rivals. *Laws* are wholly ineffectual to prevent this. They simply involve the addition of a host of evils and crimes, such as falsehood, misrepresentation and perjury, with their consequent public and private demoralization. The moment a law imposes a legal requirement of which the necessities of a life and death struggle tempt a violation, any agreement arresting that struggle must *become* reasonable, if it were not so before.

Competition in prices is most often seen in business where too much capital is employed. The process entails loss, but in ordinary industries there is a compensating gain. But if, as in the case of railroads, the capital cannot be disengaged and turned into some other channel, the loss is very damaging. If there were a railroad which the public did not really need it would have no real value. The loss would have been made when the capital was devoted to the worthless enterprise. Any combination between it and other competing lines, merely to preserve its existence, would have no merit. If the combination fixed low prices, the effect would be to saddle the stockholders of the strong companies with a burden which would make their profit too small; if high prices were maintained, the burden would be shifted upon the public. Neither ought to bear it. But where all of a group of competitive railroad lines are really needed by the public, any prosecution of competition *in rates* between them, below the point at which the profits are on a level with those in other industries, is mischievous in the highest degree, and should not be even permitted by the law, if the law could prevent it, which it cannot.

In the struggle to avoid the entire destruction of weak roads and the consequent loss of a needed public facility, one of three courses is always pursued. We must either have (1) ruinous competition, leading to the absorption of the weak roads by the powerful, or (2) the purchase of all the roads by the state, or (3) a treaty between the belligerents. A gigantic single ownership is believed to be dangerous, and state ownership has no advocates at present; consequently, a treaty of peace is the only possible recourse. Yet when such a treaty is made we have the extraordinary spectacle of the Government itself interposing and insisting that the agreement is criminal. No one claims that any of the railroads in the Association is needless and could be dispensed with. Everyone admits that competition has carried profits below the point of equilibrium.

The agreement does not discourage competition in facilities; each road must by law take all the traffic offered, and it cannot be compelled to share its earnings with any other. The power of the managers to distribute traffic does not diminish the incentive to offer superior facilities. No company will relax its energies to retain and enlarge its business, for such a course would alienate valuable customers who would never be got back. The power of the managers to allow a differential merely puts competition on the plane of a reasonable strife. Even in the matter of competition in rates the agreement does not attempt *preventive* measures. The only condition is that no road will engage in it except openly and on reasonable notice (30 days). This may be done by any party without withdrawing from the agreement. This clause was unnecessarily cautious, and it is to be confessed that this is an element of weakness in the agreement. It is confidently asserted, however, that the law would have fully justified a more binding agreement. A road might agree to be bound absolutely by the prices established by the Board of Managers, for the agreement would have no binding force in law if the prices were not within the boundary of reasonableness.

The agreement to abandon soliciting agencies is not an unreasonable restriction on competition. The Interstate Commerce Commission is quoted to show that soliciting agencies have been carried to the extreme of wastefulness. It is hoped that the agreement will save some

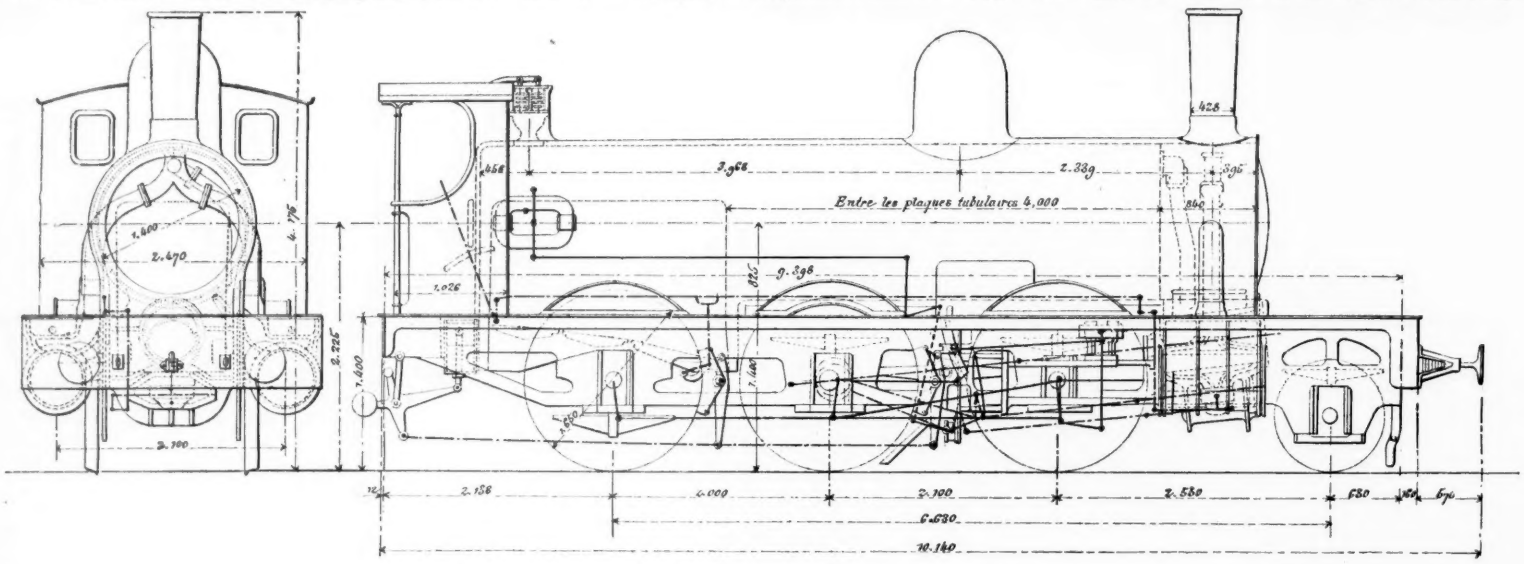


Fig 2.—Compound Mixed Traffic Engine—Northern Railway of France.

millions of dollars a year now paid to men who make themselves useful in proportion to their unscrupulousness.

Of the many decisions against pools most are cases where it was plain that the purpose was to destroy wholesome competition, and where there was an agreement by which each party secured to himself a legal right to a certain share of the total earnings.

If it is claimed that there is still a possibility of raising rates above a reasonable point it is answered that shippers have full remedies in the law requiring all charges to be reasonable. Just as soon as the railroads raise their rates above a reasonable point new capital will be ready to build new railroads. This has been the experience of the past and the same thing would occur again. The fact that many railroads are insolvent and others paying but a small return shows that rates as a whole are not now too high. The arguments about dishonest management, over-capitalization and watering of stocks have no application here. Those evils hurt the railroad stockholder and bondholder but do not affect the prices charged to the public; with these the paramount influence is the all-powerful law of supply and demand. Does anyone pretend that an over-capitalized gold mine can obtain a greater price for its gold than one not over-capitalized? Of course railroad managers try to make all the money they can; but if, in consequence of over-capitalization, they try harder, it simply stimulates competition and reduces rates. Suppose a road built with the nicest economy, with not a bit of water in the stock or bonds; yet if it did not have enough business to pay, it would be over-capitalized. The only difference between railroads and other property is that after competition reduces the profits to the point of equilibrium it will still go on to the point of ruin, unless arrested by agreement.

Again, high prices at once check the movement of passengers and freight. If the price of carrying wheat from the West were raised so as to impoverish the farmer, no wheat would be shipped. Another piece of evidence tending to show the reasonableness of railroad rates at present and in the past is the total absence of litigation upon the point. When we consider that the service may always be exacted for a reasonable sum, the absence of litigation is significant. The books scarcely present an instance.

Under the seventh point Mr. Carter takes up the possible objection that the agreement constitutes pooling. The term "pooling of freights" is very indefinite and uncertain; no one can say what it means. Did the law mean physical freight or freight earnings? The word "freights" is used in the law to mean the latter. We may charitably suppose that the law used the word "pooling" to cover a case where freight is treated *as if it were* actually brought into a common receptacle and then divided. But still we have uncertainty. The agreement to pool freight is prohibited, but in the matter of earnings an agreement is not prohibited, only the actual act of division. But waiving all uncertainties of language, the agreement does not provide for pooling in any manner. Pooling implies a definite right in each party to a definite share of the things pooled; but no one can pretend that any road has any enforceable right whatever in any traffic under this agreement. Suppose a road tried to enforce its right to a share under the agreement; it would first have to prove what its share was; but under the terms of the Eighth Article it would first have to prove what was an equitable share. What guide is there for this? Should it be on the basis of capitalization? Or working expenses? Or the capacity of the road? Could it be the percentege before received, or the percentage which had before been allotted to it? Moreover, the circumstances affecting equitableness change from day to day. It is entirely manifest that the intention was to leave this matter indefinite and at the discretion of the managers. Next, the complaining road would have to prove that it had not secured its share and that others had. But this would amount to nothing. Each road has the right to carry everything offered to it and to retain the entire earnings. All a complaining road could do would be to assert that the managers had failed to perform a duty, and to do this it would have to show that there was some lawful act which the managers might and ought to have performed to help the complainant. This shows the absurdity of the Government's contention. The agreement does not attempt to pool traffic or earnings. It gives no right in either to any party. No moneys received by one can ever be recovered from it by another. No party can ever effectually demand that a pound of freight should be directed to its line which would otherwise go to another. The only thing done is to make it the duty of certain persons called managers to bear in mind that it is highly important that each party to the agreement should receive what in their judgment is an *equitable* share of the competitive traffic, and that if there are any *innocent and lawful things* which they may do, which would tend to secure that object, they should do them.

Pooling of physical tonnage is impossible. Most freight is routed by the shipper. The Government may claim that the agreement evades a statute, but violations cannot be asserted where the thing prohibited is not done. The Eighth Article is designed to accomplish some of the objects which pooling accomplishes, but if those objects are not prohibited they may be lawfully accomplished by any means, other than pooling, which will bring them about. If the Government argues that the Eighth Article is thus shown to be ineffective the defendant regretfully admits that that may be the case. The agreement has, indeed, elements of weakness; the roads would have made an agreement to pool if they had been allowed to do so.

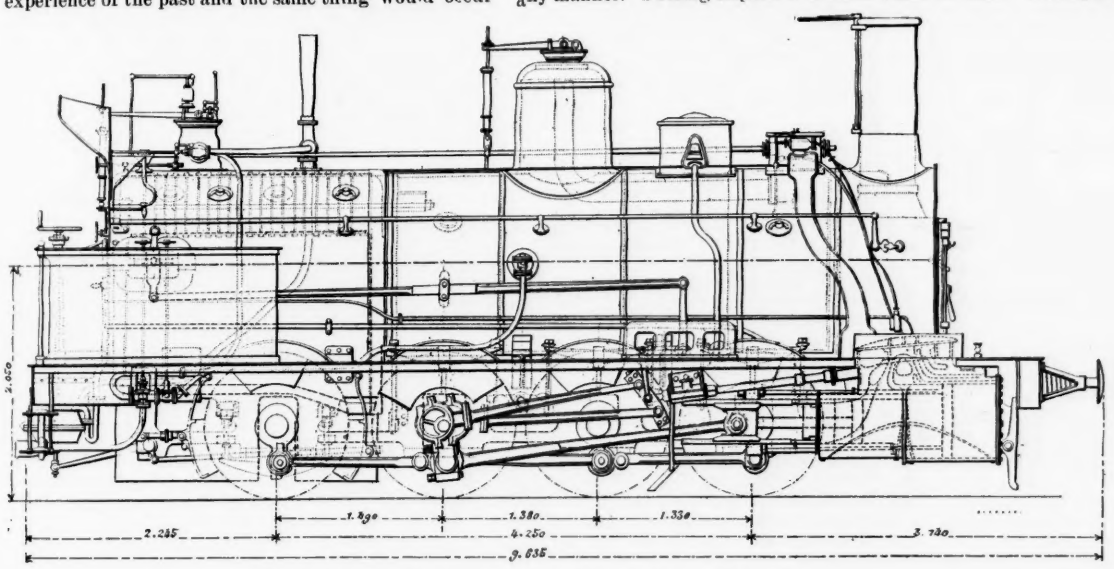


Fig. 3.—Tandem Compound Locomotive—Northern Railway of France.

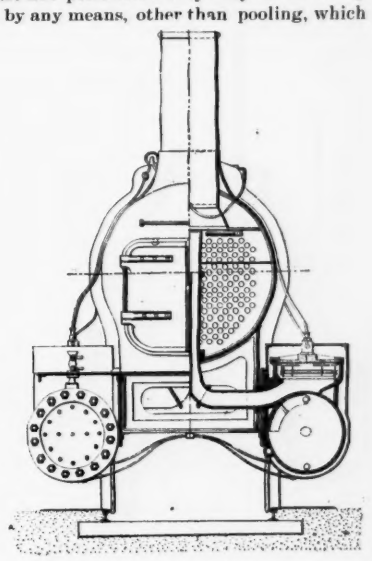


Fig. 4.

The Present Status of the Compound Locomotive in France.

BY M. MAURICE DEMOULIN, *Engineer Western Railroad of France.*

The compound system of locomotive construction has been receiving an extensive application in France for several years, especially upon passenger and fast freight trains. It may even be said that the standard express engines used by the two great companies, the Northern and the Paris, Lyons & Mediterranean, are built on the compound system and that these companies have ordered no others since 1890. The Southern (Midi) Company intends to follow the precedents set by these two; the Western Company is still in the experimental period, while the Eastern & Orleans Company are still awaiting developments. The last is the only one of the great railroad companies of France that is not the owner of a compound locomotive.

With a few interesting exceptions, which we will examine, the four-cylinder compound, working upon two axles, is received with the greatest favor, and this is due to the very marked advantages which it has developed in service.

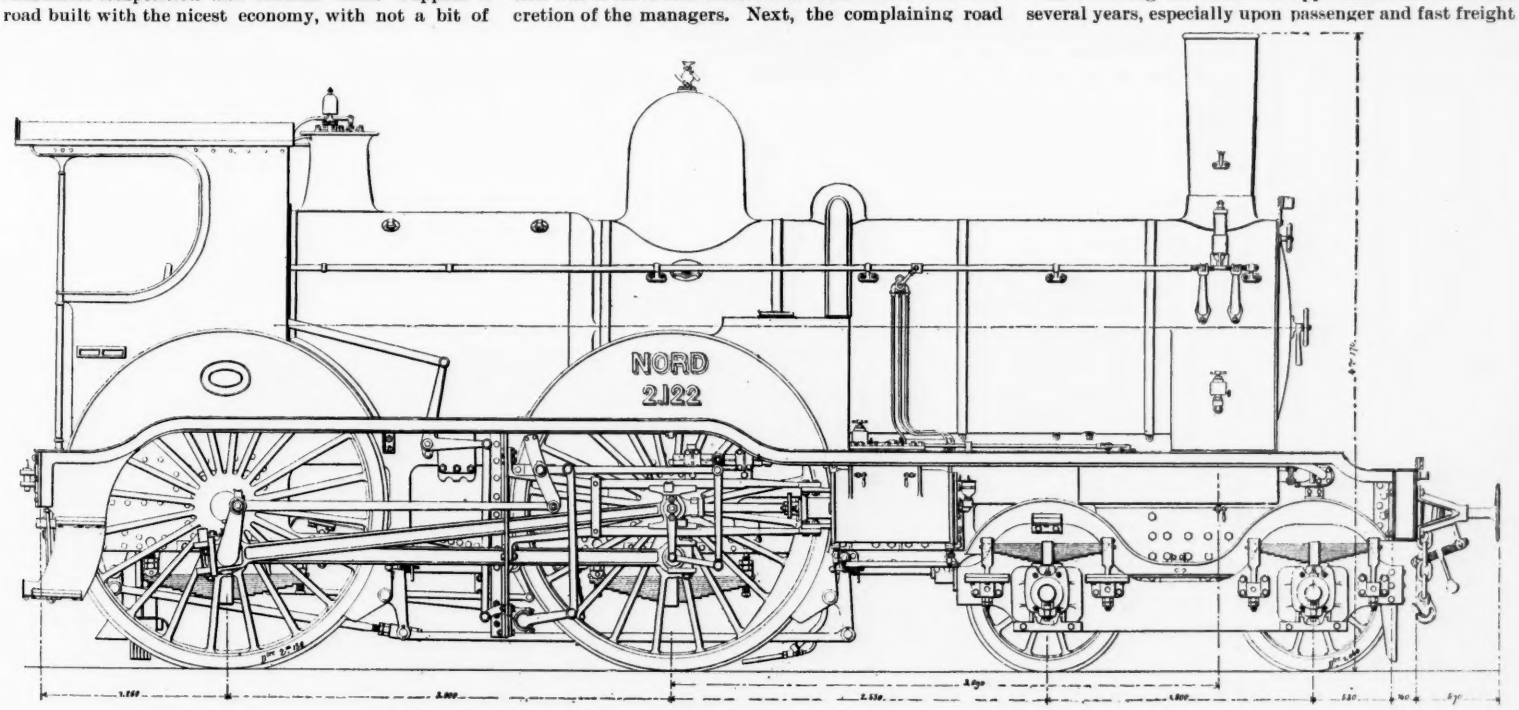


Fig. 5.—Two-Cylinder Compound Express Engine, 1892—Northern Railway of France.

We will examine in succession the principal types that are actually in use, whether they are merely on trial or have been adopted as standards by the different French companies.

THE NORTHERN RAILROAD COMPANY.

The Northern Railroad Company put its first four-cylinder compound locomotive, with four driving-wheels, into service into 1886, and this was, we believe, the first of its type to be used (Fig. 1). This engine differed only in its details from the ordinary express locomotive used by the company; a fact which rendered the experience obtained with it conclusive and the results comparable.

The arrangement of the cylinders of this engine, which was built from the plans of M. de Glehn at the shops of the *Société Alsacienne* in Belfort, for the sake of facilitating the dismounting, were arranged with the two high-pressure cylinders on the inside and driving two cranks keyed at right angles to each other on the central axle, while the two low-pressure cylinders were placed outside of the frames and drove the back pair of wheels whose axle passed beneath the firebox. There was no side rock. This locomotive (No. 701) served as the prototype of the engine finally adopted by the Northern Company, differing from it only in the position of the cylinders; the high pressure having been placed upon the outside and the low pressure inside of the frames. A little later we will examine this latter engine, whose excellent performance led to it adoption.

In August of the following year (1887) the same company put a mixed locomotive into service, having six wheels coupled, as shown by Fig. 2. It was of the three-cylinder type, designed on lines peculiar to itself by M. E. Sanvage, who was at that time the engineer in charge of the shops of the company. This locomotive, which, like the preceding one, was exhibited at the Paris exposition of 1889, can be run either as a simple or compound engine. The three cylinders, of which one is between the frames, are located at the front end, upon the same center line, between the front driving axle and a leading truck axle held in a radial box. The three connecting rods take hold of cranks on the second driving axle. The inside cylinder, which lies in the center line of the engine, is the high-pressure one, the other two on the outside and equal to each other in diameter are the low pressure. The valve motion for the two outside cylinders is of the Walschaert type; that of the high pressure is of a peculiar and very ingenious construction, having two valves, placed the one over the other, a description of which would occupy too much space, but which permits, by a very simple movement, direct steam to be admitted into the steam chests of the large cylinders for starting, while the high-pressure piston at the same time has steam admitted to both faces, thus annulling its action and allowing the machine to work as a simple engine. As these outside cylinders had a diameter of .500 m. (19.68 in.) and a stroke of .700 m. (27.56 in.), the locomotive was placed in the most favorable position possible for starting. By means of a special connection conveniently located for the engine driver, the upper valve could be moved to the right, and the admission of direct steam cut off from the low-pressure cylinders, and the engine converted into a compound.

At the exposition of 1889 the Northern company showed another type of compound locomotives, which was a modification of one of the 400 completed freight locomotives of the eight-wheel type, then owned by this company. M. du Bousquet, who was Chief Engineer of the company, designed this locomotive, adhering as closely as possible to the standard type in order that the modification might be readily applied in case experience should justify its extension.

The single cylinder of these locomotives is simply replaced by two cylinders set tandem (Figs. 3 and 4). The small cylinder had a diameter of .38 m. (14.96 in.) and the large .66 m. (26 in.) with a common stroke of .65 m. (25.59 in.), giving a ratio of volume of one to three. The large cylinder is in front, the small one being between the two low-pressure piston rods, which are connected to the same crosshead as that of the small cylinder. The four cylinders drive the third axle from the front, the three piston rods of the same group being united in a single crosshead.

The steam distribution is accomplished with a single valve and the steam follows the course indicated by the arrows in its passage from the small to the large cylinders.

This locomotive always works as a compound, even for starting, although a special valve permits live steam to be admitted directly into the large cylinder. This arrangement renders the engine very powerful at starting, the large cylinders having a diameter much larger than the simple engines of the same class. The mechanism was changed in none of its parts. On Dec. 31, 1895, the Northern Railroad Company had 23 engines of this class,

Encouraged by the excellent results obtained with locomotive No. 701, as well in the economy of coal as in the satisfactory operation and diminution of locomotive expenses, the Northern Company decided, in 1890, to order two more compound locomotives, in which some improvements, indicated by experience as being necessary, were made. The engines were designed and constructed by the *Société Alsacienne*, at Belfort, under the direction of its Manager, M. de Glehn, and Mr. de Bousquet, the Chief Engineer of the company. They were put into service in 1891 (Figs. 5 and 6).

This type belonged to a characteristic class of locomotives in France, and has given perfect satisfaction. It has been imitated by other railroad companies in France and abroad, and is distinguished from locomotive No. 701 (Fig. 1) by the following characteristics:

1. A large boiler with a deeper firebox, the back axle being behind and not beneath the firebox.
2. The four driving wheels coupled for the purpose of reducing the slipping that takes place at starting.
3. The use of an arrangement by means of which it is possible, when necessary, to exhaust from the small cylinders directly into the atmosphere, and at the same time admit steam at a pressure of 85 lbs. per square inch directly from the boiler into the large cylinders.
4. The addition of a bogie truck in front instead of the single pair of wheels.

These engines, one of which was shown at the Chicago Exposition of 1893, is illustrated by Fig. 5. The high-pressure cylinders are placed outside the frames, the low pressure between the same and beneath the smoke-box, an arrangement just the reverse of that adopted for locomotive No. 701. The former are coupled to the back pair of drivers and the latter to the intermediate.

The two valve motions are of the Walschaert type and can be connected or made independent of each other as

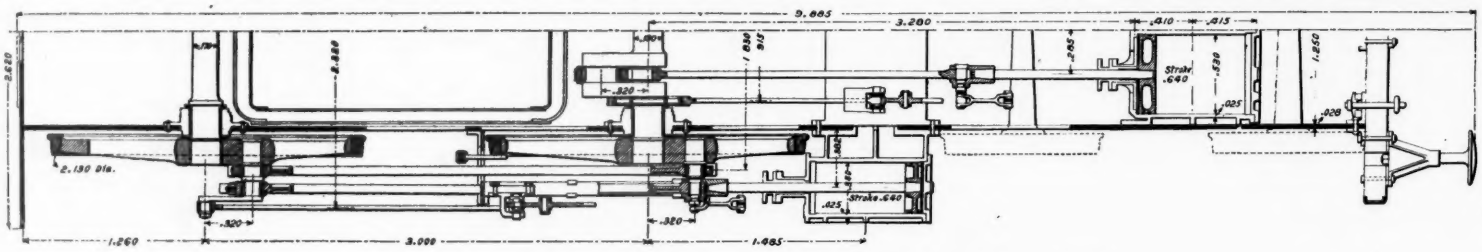
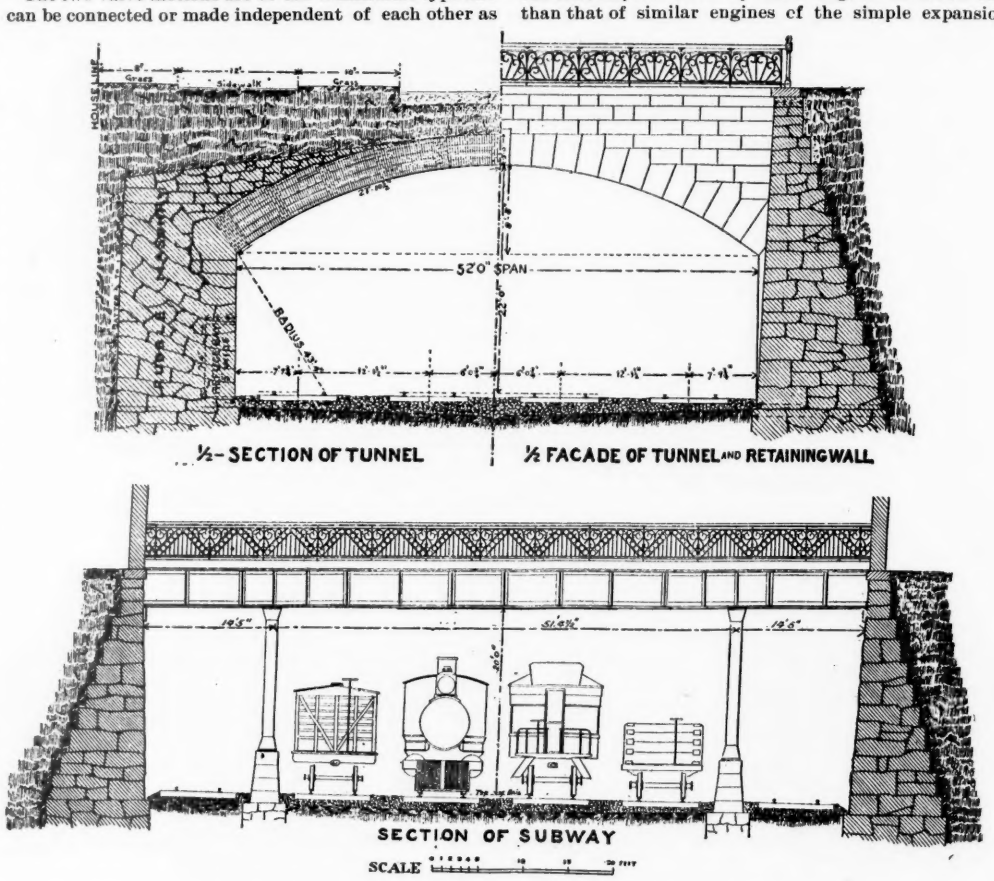


Fig. 6.—Four-Cylinder Compound Express Engine—Northern Railway of France, 1892.



the engine driver may desire, the two operating screws being turned separately or together by means of two gear wheels that mesh with one another, and may be fastened to the screws or left loose upon them.

It order to reduce the loss of time at starting as much as possible the high and low-pressure cranks are keyed on at an angle of 162 deg. with each other, so that a steam admission to one or the other of the cylinders is always assured. Keying at 180 deg. would be more advantageous if we consider the balancing of the reciprocating parts, but it would introduce an element of some uncertainty in starting. Furthermore, in order that the live steam admitted direct to the low pressure cylinders may not exert an injurious back pressure upon the high-pressure pistons, the piping is so arranged that the exhaust from the small cylinders may be delivered directly into the atmosphere. This direct exhaust is obtained by means of two three-way cocks under the control of the engineer, through the action of a small steam piston acting as an auxiliary motor. By means of this arrangement the tractive effort at starting can be raised from 11,154 lbs. to 22,000 lbs.

The boiler is built to carry a steam pressure of 200 lbs. per square inch.

This engine is provided with a six-wheeled tender carrying 14 tons (3,920 gals.) of water and four tons of coal.

On a continuous grade of one-half of one per cent., or 26½ ft. to the mile, these engines easily haul a train weighing 140 gross tons, exclusive of the engine and tender, at a speed of 52.8 miles per hour, and a train of 200 gross tons at a speed of 46.6 miles per hour. The speed varies a little with the profile of the line, the new compound engines ascending grades at a speed considerably greater than that of the old non-compound express locomotives. With a train weighing 178 gross tons back of the tender, and at a speed of 47.2 miles per hour, they have developed 1,076 I. H. P.

In ordinary service the coal consumption is 15 per cent. less than that of the old non-compound locomotives, carrying from 142 lbs. to 156 lbs. of steam per square inch.

Again, in comparative tests regarding the consumption of water that were made with the two engines on the line running from Paris to St. Quentin, a distance of 93 miles, with trains having the same net load of 180 gross tons, the following results were obtained:

	Consumption of water.
Simple engine ....75 liters per kil. (266 lbs. per mile)	
Compound engine..... ....58.17 " " " (204 " " ")	

or a saving in favor of the compound of 23.28 per cent.

Despite the increase in the number of working parts, the consumption of oil by these engines is much less than that of similar engines of the simple expansion type, 15.5 gr. per kilometer (0.7 lbs. per mile), instead of 17.3 gr. (0.77 lbs. per mile).

The company has also made some experiments in order to determine the advantages of adopting four cylinders and coupled drivers. The side rods were removed for several months from compound engine No. 2121. With trains back of the tender weighing from 145 to 170 gross tons, in spite of the pleasant weather, there was always some slipping at starting and even upon the road on some grades; the starting was less rapid; the drawbar pull of the engine was not as even, and some disturbances were produced that were due to the fact that the relative positions of the reciprocating parts were no longer maintained by the side rods.

The introduction of live steam into the receiver while the small cylinders are exhausting into the atmosphere, the coupling of the driving wheels and the use of the

steam sander insures, for these locomotives, that rapidity in starting which is, perhaps, their most characteristic feature.

The four-cylinder engines, in spite of the increase in the number of parts run fewer chances of becoming disabled on the road than their two cylinder sisters, in case of the breakage of a part of the machinery. Thus, on the second section of train 17 on Dec. 16, 1891, the front cylinder head of the low-pressure cylinder was broken when 43 miles out, but the engineer hauled the train into Amiens, 38 miles further, with the high-pressure cylinders alone. This run of 38 miles, of which 10½ miles is up a continuous 0.4 per cent. grade was made on time at the average running speed of 46 miles per hour, with a net load of 150 gross tons. Such a run would, of course, have been impossible but for the perfect independence of the two valve motions.

The Northern Railroad Company has built several series of these engines in succession to the number of 38. They are now hauling the greater portion of the better class of express trains upon the road; but, as the weight and speed of these trains are constantly on the increase, it is easy to see that the time is coming when they will no longer be powerful enough for the work. The company has, therefore, had three engines of this same type built for them at Belfort. They are intended for trial, are much stronger and of the type described elsewhere as belonging to the Southern (Midi.) Railroad. They weigh 119,240 lbs. in working order, instead of 105,160 lbs.

The principal dimensions of the compound locomotives of the Northern type are as follows:

Grate area	21.96 sq. ft.
Average internal diameter of shell	49.78 in.
Heating surface in firebox	146.07 sq. ft.
" " " tubes	1,065.42 "
" " " total	1,211.49 "
Boiler pressure	198 lbs. and 212 in last 20 engines.
Diameter of driving wheels	6 ft. 11.23 in.
" " truck wheels	3 ft. 3.53 "
Total wheel base	24 ft. 0.6 "
Diameter of cylinder H. P.	13.37 in.
" " " L. P.	20.87 "
Stroke of pistons	25.2 "
Ratio of volumes of cylinders	2.42
Theoretical tractive effort { Compound	17,294 lbs.
Theoretical tractive effort { Direct admission to L. P. cylinders	22,050 "
Weight of engine empty	96,584 "
" " " in working order	105,391 "
" " " on front truck wheels	38,142 "
" " " " second " "	38,142 "
" " " " front driver wheels	33,842 "
" " " " back " "	33,401 "
Total adhesive weight	67,243 "

(TO BE CONTINUED.)

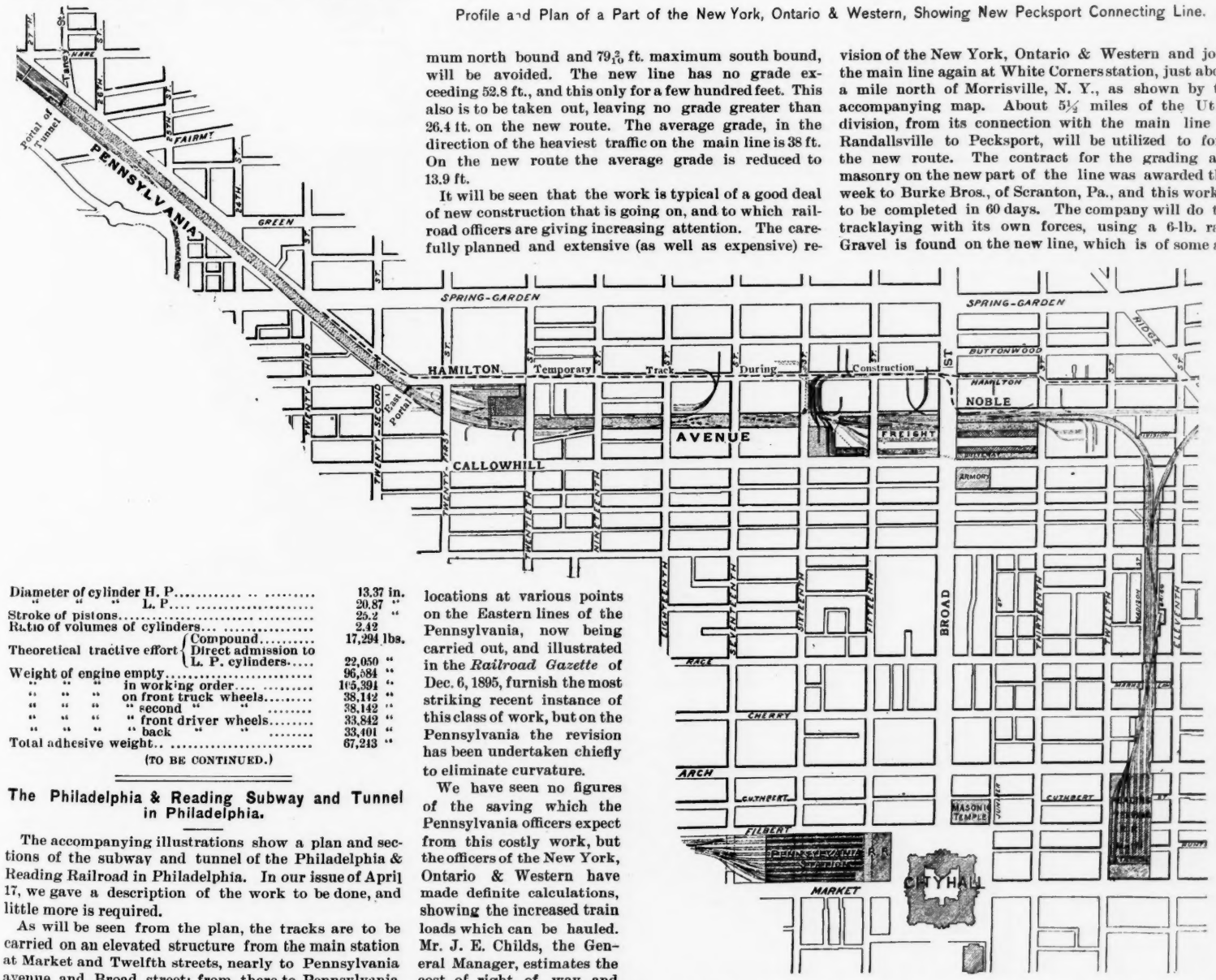
The Philadelphia & Reading Subway and Tunnel in Philadelphia.

The accompanying illustrations show a plan and sections of the subway and tunnel of the Philadelphia & Reading Railroad in Philadelphia. In our issue of April 17, we gave a description of the work to be done, and little more is required.

As will be seen from the plan, the tracks are to be carried on an elevated structure from the main station at Market and Twelfth streets, nearly to Pennsylvania avenue and Broad street; from there to Pennsylvania avenue and Callowhill street, there will be an open subway; from this point to Taney street there will be a tunnel, and a subway again from the end of the tunnel to Thirtieth street. This will require 1,060 ft. of elevated structure, 6,028 ft. of subway and 2,912 ft. of tunnel.

The subway, as shown in section, carries from four to six tracks, and is at an average depth of 25 ft. below the present grade. There are four tracks in the tunnel at a somewhat greater distance below the surface than in the subway.

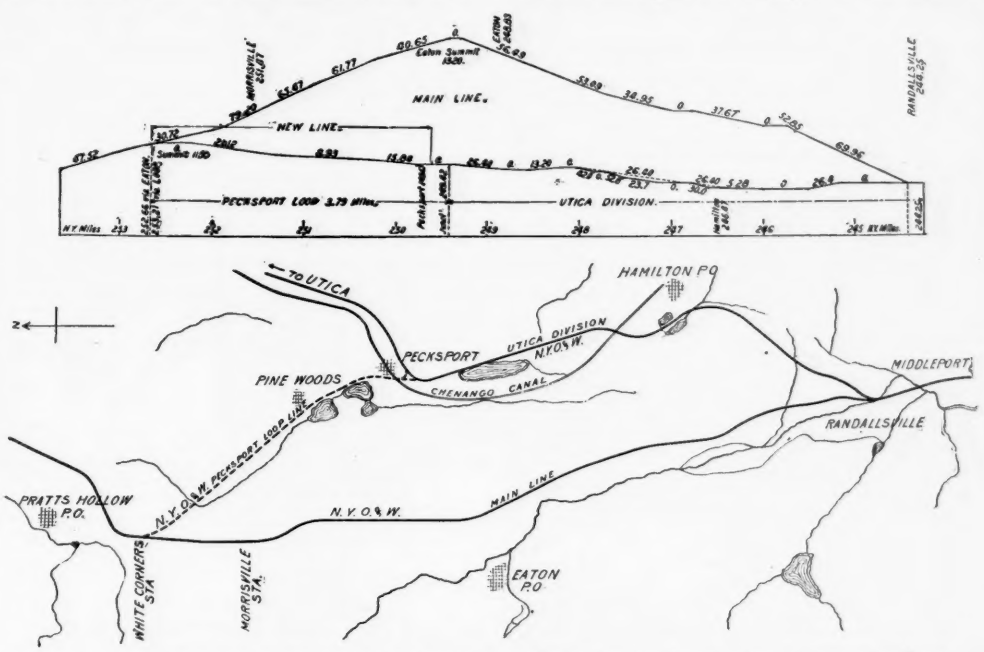
The estimated cost of the entire work is $6,000,000. The bids submitted were opened May 12, but up to the time of our going to press no contracts have been awarded.



Plan of the Philadelphia & Reading Subway and Tunnel in Philadelphia.

The Pecksport Connecting Line of the N. Y., O. & W.

The New York, Ontario & Western is just beginning a piece of new construction work which will be quite well understood by reference to the plan and profile. By building a new line, 3.79 miles long, the haul over the long and heavy grade at Eaton Summit, 70 ft. maximum north bound and 79$\frac{3}{10}$ ft. maximum south bound, will be avoided. The new line has no grade exceeding 52.8 ft., and this only for a few hundred feet. This also is to be taken out, leaving no grade greater than 26.4 ft. on the new route. The average grade, in the direction of the heaviest traffic on the main line is 38 ft. On the new route the average grade is reduced to 13.9 ft.



Profile and Plan of a Part of the New York, Ontario & Western, Showing New Pecksport Connecting Line.

It will be seen that the work is typical of a good deal of new construction that is going on, and to which railroad officers are giving increasing attention. The carefully planned and extensive (as well as expensive) relocations at various points on the Eastern lines of the Pennsylvania, now being carried out, and illustrated in the *Railroad Gazette* of Dec. 6, 1895, furnish the most striking recent instance of this class of work, but on the Pennsylvania the revision has been undertaken chiefly to eliminate curvature.

We have seen no figures of the saving which the Pennsylvania officers expect from this costly work, but the officers of the New York, Ontario & Western have made definite calculations, showing the increased train loads which can be hauled. Mr. J. E. Childs, the General Manager, estimates the cost of right of way and construction at $70,000, on which the annual interest charge at five per cent. would be $3,500. Engines now haul 500 tons of freight over the Eaton Summit, but they will take 1,030 tons over the new line. On a basis of 125 cars a day, north bound, the direction of heaviest freight, the saving would be 17½ engine miles for 10 trains, or $10,000 a year; about three times the interest on the cost of the improvement. There will be an additional saving on southbound trains, as 3½ miles of heavy grades, near the summit, will be avoided. A saving in maintenance is also to be be considered as the new line is located in the valley, where no snow drifts are encountered, while Eaton Summit is one of the worst points on the road for snow blockades. The growth of the company's coal tonnage bound for Oswego, Canada and the West, and also the growing tonnage of the Delaware & Hudson Canal Co., hauled over this portion of the road, are urgent reasons for making the improvement.

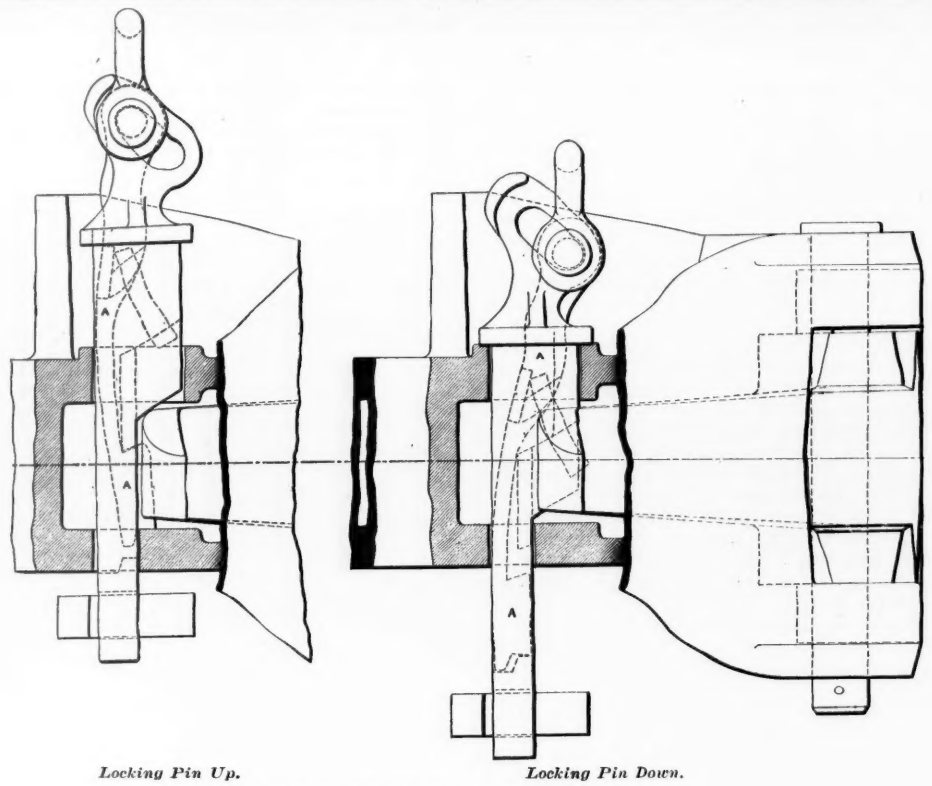
The new line begins near Pecksport on the Utica Division of the New York, Ontario & Western and joins the main line again at White Corners station, just about a mile north of Morrisville, N. Y., as shown by the accompanying map. About 5½ miles of the Utica division, from its connection with the main line at Randallsville to Pecksport, will be utilized to form the new route. The contract for the grading and masonry on the new part of the line was awarded this week to Burke Bros., of Scranton, Pa., and this work is to be completed in 60 days. The company will do the tracklaying with its own forces, using a 6-lb. rail. Gravel is found on the new line, which is of some advantage to the company, as it will save the long hauls of material for ballasting its northern division.

New Janney Locking Pin.

The McConway & Torley Company is now putting into quite extensive use a new locking pin for the Janney coupler. We give two engravings made from drawings showing this device in two positions.

The new feature is the automatic trip marked *A* in the engravings. This automatic trip is intended to obviate the necessity of locking up the uncoupling lever

when switching cars. When the pin is raised to an unlocking position, it remains there until the tail of the knuckle travels in or out. The knuckle will lock in the act of coupling whether the pin is up or down in a locking position. If the pin has been raised, and for any reason it is desired to drop it to a locking position without cutting the train, it will fall to the locking position by simply striking it an upward blow on the lower end.

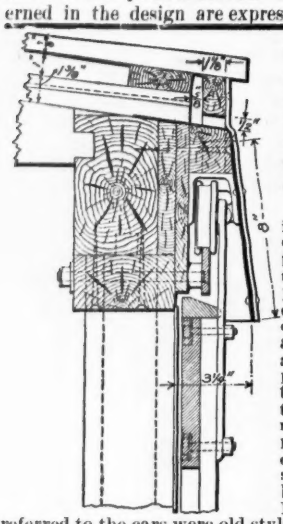


Locking Pin Up. *Locking Pin Down.*

Standard Janney Freight Coupler with New Locking Pin.

The Lake Shore Box-Car Door.

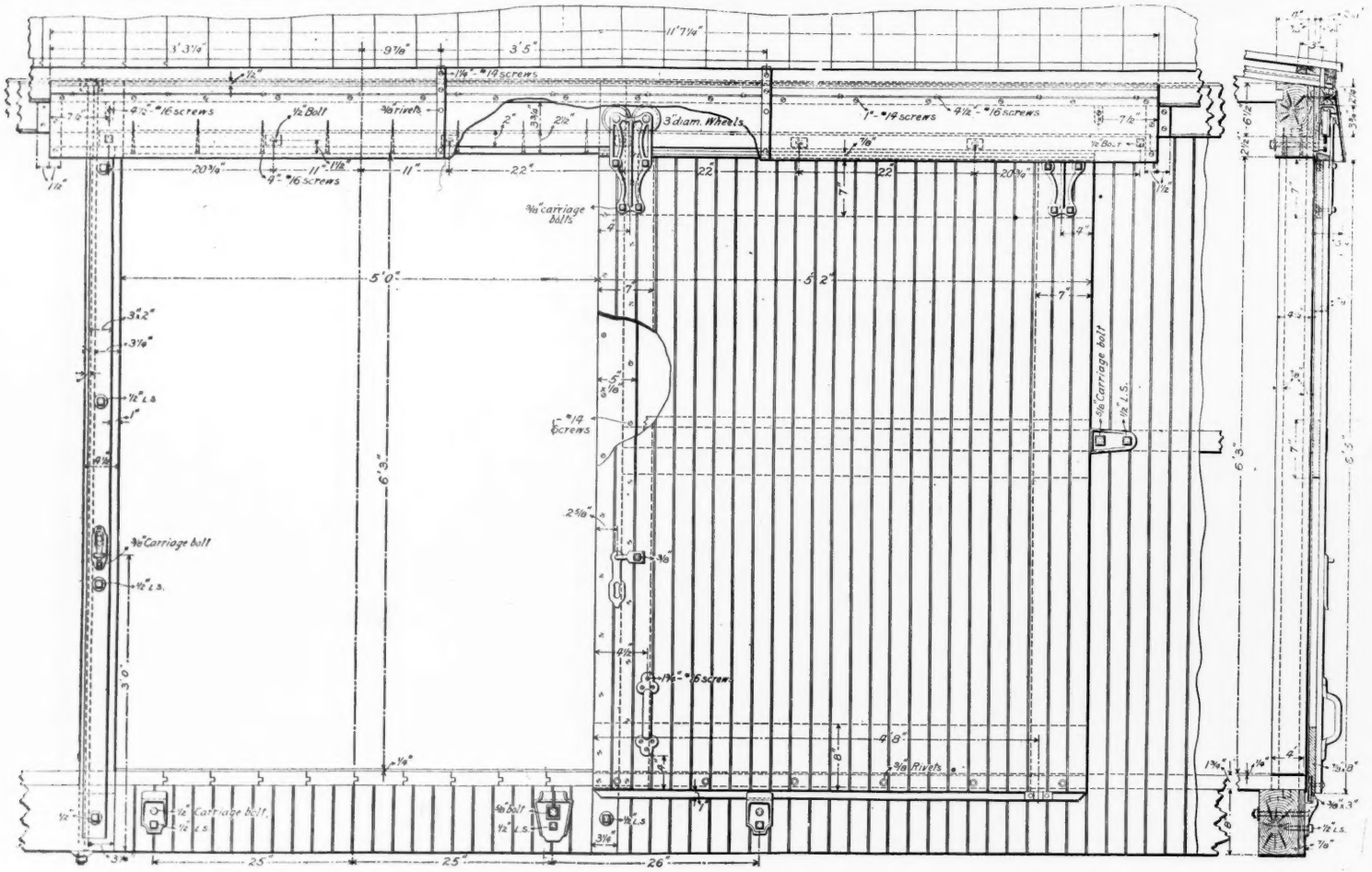
The engravings show the standard box-car door of the Lake Shore & Michigan Southern Railway so completely that no descr'ption is needed. The ideas that have governed in the design are expressed in the following remarks made by Mr. Waitt in a discussion on Car Doors in the Western Railway Club last November. This discussion was reported in the *Railroad Gazette* of Dec. 27, 1895:



"I feel considerable interest in this subject of car door hangers and fastenings from the fact that during the past year we have had several instances of doors coming off freight cars at just the time when a passenger train was passing on the other track. It would seem to be quite a serious matter to accept and run over a road freight cars that have doors in such a condition as to be likely to drop off. In many of the cases referred to the cars were old style; in one recent case it was a box car that was never built with truss rods. Some were old-style doors, being hung at the bottom on the rail with cast-iron shoes, and held at the top by a wooden cap rabbeted and lapped down over the outside of the door, letting the door project into the inside of the rabbet perhaps ¾ of an inch. Evidently the car had been sagged or buckled to a certain extent by the application of air-brakes on the four, five or ten cars at the forward end of the train. This box car without truss rods, which in a train with ordinary kind of brakes might not have given trouble, sagged enough to allow the door to rise and the shoe to come clear of the top of the rail, thereby allowing the wind to get in behind the door, tearing it loose and swinging it out, so that it collided with the passing train.

"I believe as a general rule, from my own experience, that no car ought to be run with doors supported on the bottom rail. It is a pretty broad statement to make, but I have never yet seen any style of fastening where the door was supported entirely by the bottom rail that I believed was safe. The bottom rails are liable to become bent by loading or unloading freight, by a wagon backing into them in a yard, or as a result of the car being wrecked. They are also liable to sag from the bolts becoming loose (the rail sagging), or on account of the cars not being trussed up properly. Any of these features is liable to allow the shoe to rise above the rail, and unless the door is nailed with the back end toward the wind, the wind is likely to come in and you are liable to have trouble. To be sure, there are many doors hung at the top that are not particularly safe, but I believe they have a vast advantage over any style that is supported on the bottom. We have had a case of a certain make of flush doors that are supported on the bottom rail, where the rod that comes up from the shoe (which is supposed to fasten the door in its place) was too short; as a result of that we had one of these doors cause serious trouble on our road.

With doors hung at the top I believe the hangers ought to be so constructed that, even though the bolts that fasten them to the doors may become loose, the hanger can not in any way push up high enough to unhook itself from the top rail. A stop of some kind can be put on the casting, if it is a casting, or on the forging, if it is a forging, to prevent this, and I think it is a feature that ought to be looked into. We must design our car-door hangings so that it is impossible (unless the car is wrecked) in any ordinary service of the doors to become unhung, either at the top or bottom. We must be careful to have a sufficient number of shoes or brackets at the bottom to keep the door in, no matter how hard the wind may be blowing, no matter whether the door is fully open, closed or partly open."



Standard Box-Car Door—Lake Shore & Michigan Southern.

Turret Lathe and Screw Machine.

We present herewith cuts of a Turret Lathe and Screw Machine just brought out by the Niles Tool Works, of Hamilton, O., which is well adapted to railroad work. It is capable of doing a large range of work, and has all the advantages of the company's screw machine, together with those of flat turret lathes. There are a number of special features worthy of particular notice.

The lathe, which is shown in Fig. 1, takes in work up to 2 in. in diameter and to 24 in. in length, and the speed can be instantly changed from cone to back gear. The automatic stop-feeding mechanism, which takes in all sizes of round, square or hexagonal stock without adjustment, is always ready, requiring no change. This feed also feeds forward, no matter in what direction the lathe is running, while in other tools of this kind if the lathe is reversed the stock is fed backward.

The chuck is strong and so constructed as not to withdraw the stock from the guage in closing, and the jaws are opened and closed by power throughout their entire range from ⅛ in. to the full opening, no collets being used.

The feed is by a central screw directly under the work. Both the turret and carriage can be fed in either direction simultaneously, thus letting two or more tools be operated together. The turret has automatic adjustable feed stops for each tool and will operate when feeding in either direction. These adjustable stops are placed in front of the machine where they re entirely free from

chips and dirt and can be quickly adjusted. The entire turret equipment can be used without interference and is so constructed that long work can pass through it without interfering with the action of the tools.

Instead of the usual cut-off, they have on this machine the gibbed carriage, the same as used on their standard screw machines, with front and back tool posts, with its power-bed fed longitudinally. With this arrangement cuts can be taken with the carriage tools at the same time the turret tools are in operation.

They have retained on this machine the opening die plate on the hinged arm, by means of which the thread is first cut before using solid die for sizing, and the work can be quickly backed off The gross weight of the machine is about 5,000 lbs., and includes in its equipment:

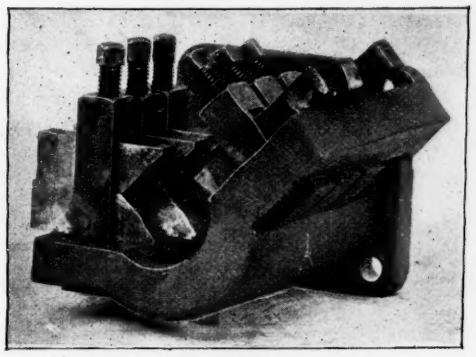


Fig. 3.

Automatic chuck, all sizes without change, automatic stock-feeding device, carriage with front and back tool post, opening die-plate and arm, a turning-tool with eight bushes (Fig. 2), box tool-holder with turning-posts and back-rest (Fig. 3), stop-holder with stop (Fig. 4). A taper tool (turning) with former is furnished if desired (Fig. 5).

A Compound Locomotive in Suburban Service.

We give below a comparative statement of the performance of a Richmond compound locomotive in suburban service. We regret that the railroad officer who conducted the test is too modest to have his name or that of his company mentioned, but the statement would not lose anything by having both divulged.

Both the engines were built at the shops of the railroad company, and are identical in every particular save in the front end. The compound device was furnished by the Richmond Locomotive Works, but was not attached or supervised by them. In other words, the railroad company simply bought a pair of cylinders from the Richmond Locomotive Works as they would have bought any other furnishing of a locomotive.

An interesting feature of the statement is its bearing on the question as to whether or not a compound is suitable for suburban service. It would seem that in this case in the 24 trips the compound made 494 stops and reduced speed to less than three miles per hour 148 times, and must have picked up train and got under way with great ease, as it actually spent less time on the road with train and in running than the simple.

The conditions were so much alike with the two engines that they must be accepted as the same, although it is manifest that the train was light for such heavy engines, which was against the compound, as it is especially adapted for hard service. The steam pressure was also against the compound, being lower than the simple, whereas the reverse is the usual practice; and for 10 trips the compound heated the train.

The compound saved 11,570 lbs. coal, or 20 per cent., which will not be appreciably affected by the slightly heavier train of the simple engine. The pounds of coal per engine-mile show the same percentage in favor of the compound. The coal per car-mile only shows about 14 per cent. saving, owing to the lighter load of the compound.

We will not further analyze the figures, but it will be interesting to mechanical men to do this for themselves. The compound has been continually in service day in and day out since it was built three months ago.

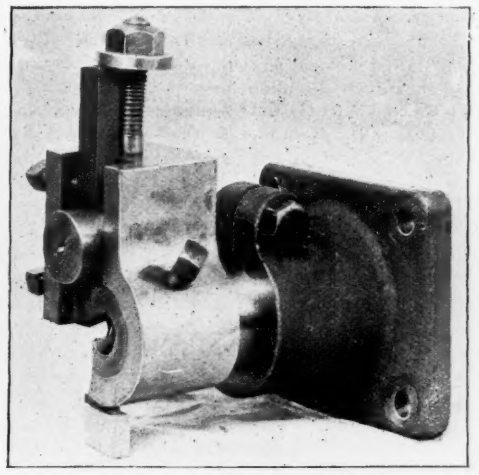


Fig. 2.

COMPARATIVE WORK OF SUBURBAN ENGINES.

Kind of engine.	Richmond Compound.	Simple.
Number of trips made	24	24
Average steam pressure	154.1 lbs.	156.5 lbs.
Total weight of water evaporated	273,386 "	318,774 "
Total weight of coal consumed	46,630 "	58,200 "
Temperature of feed water	61° F.	62° F.
Weight of water evaporated per pound of coal	5.86 lbs.	5.47 lbs.
Average number of cars hauled	6.07	6.53
Car miles	3,352	3,611
Engine-miles with train	552	552
" " light	102	102
Total engine-miles	654	654
Pounds coal per car-mile	13.9 lbs.	16.117 lbs.
" " " engine-mile	71.3 "	88.99 "
Number of hours under steam	142 hours.	144 hrs., 30 min.
Number of hours on road with train	31 hrs, 9¼ min.	32 " 3 "
Number of hours actual running	27 " 8¾ "	27 " 43¾ "
Number of hours on road with light engine	8 " 44	7 " 40 "
Number of trips steam heat was in use	10	none
Total number of stops made	494	516
Times speed reduced to less than 3 miles per hour	148	122
Weather report	2 days clear, 2 days clouded, 2 days rain	2 days clear, 4 days clouded

GENERAL INFORMATION CONCERNING THE ENGINES.

Total weight in working order	160,300 lbs.	159,386 lbs.
Total weight on drivers	116,300 "	115,386 "
Diameter of driving wheels	5 ft. 3 in.	
Total wheel base	25 ft. 6 in.	
Extreme length over pilots	42 ft. 7½ in.	
Length of main rod	6 ft. 8⅝ in.	
Diameter of cylinders	19 in. and 29 in.	18 in.
Stroke of piston	24 in.	24 in.
Diameter of piston rods	3⅜ in.	3⅜ in.
Size of steam ports	1¼ × 20	1¼ × 18
" exhaust ports	3⅛ × 20	3 × 18
Width of bridge	1⅛ in.	1¼ in.
Kind of valves	Balanced slide	Balanced slide
Greatest travel of valves	5½ in.	5⅛ in.
Outside lap	H.P. 1⅛, L.P. ⅞	⅞ in.
Inside clearance	H.P. 3/16, L.P. ⅛	Line and Line
Lead at fuel stroke	1/16 in.	1/16 in.
Type of boiler	Straight top	
Outside diameter of smallest ring	4 ft. 8¼ in.	
Thickness of steel throat and back head	½ in.	
Thickness of firebox, sides, door, crown and tube sheets	5/16-5/16-3/8-½	
Dome—height and inside diameter	26 in. × 25 in.	
Crown sheet supported by	Crown bars.	
Number of flues	187	
Diameter of flues	2 in.	
Length of flues	10 ft. 10½ in.	
" " firebox inside	6 ft. 9⅜ in.	
Width " " "	3 ft. 5⅜ in.	
Water space—sides, back and front	3½ in.-5½ in.-4 in.	
Steam pressure	175 lbs.	
Kind of grate	Cast-iron rocking.	
Grate surface	23.3 sq. ft.	
Heating surface	1,050.6 sq. ft.	
Kind of stack	Straight	
" " exhaust nozzle	Single	
Diameter " "	5 in.	4½ in.
Capacity of tank	1,840 galls.	

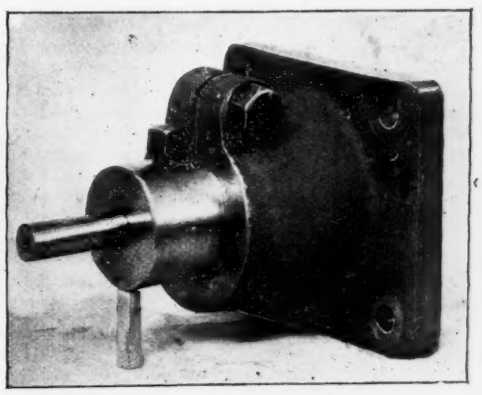


Fig. 4.

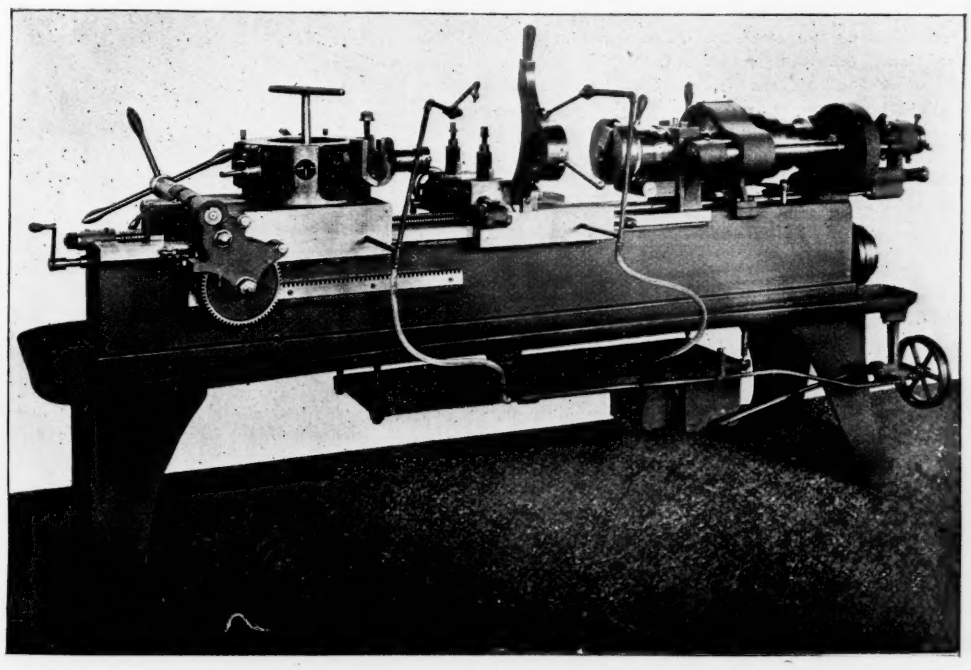


Fig. 1.—Turret Lathe and Screw Machine.

Signals at Newcastle, England.

In connection with extensive improvements of its stations and premises at Newcastle during the last few years, the North Eastern Railway of England has made elaborate alterations and additions to its fixed signals, the work extending over four years. From a private letter received by Mr. Henry Johnson, of Rahway, N. J., we copy, by his permission, some notes on this work:

"Within a space of five-eighths of a mile we have brought into use 620 levers. They are comprised in six different frames, and six signal towers. The largest consists of 244 levers, and the smallest of 30 levers. The next to the largest one has 150 levers.

"All the signals are made of iron, many of them on bridges spanning a large number of lines. All switches are connected with channel iron rods carried on slotted rollers. The quantity of rod used is 25 miles, and the signal wire 30 miles, while we have used about five miles of chain.

"The total cost of the work, exclusive of signal cabins, has been £30,000. The cabins I have no doubt cost another 5,000, making the total £35,000. The work was carried out by contract and four firms were asked to compete, viz.: Stevens & Son, The Fazakerly Works, Saxby & Farmer and McKenzie. The latter firm received it, Stevens & Son being the next lowest bidder and Fazakerly being next.

"It was all done to a specification, the details of the interlocking being worked out and supplied them, and the frames tested before leaving the contractors' shops. It required the time of one man for about three months, working long days to get out the locking for the 244-lever frame.

"The Board of Trade officers are now very strict, not to say hypercritical. General Hutchinson was told off to inspect this work from time to time. He visited Newcastle five different times and at his final examination he accorded unstinted praise for the manner in which the work had been carried out. In testing the 244-frame he commenced at 8 a. m. on a Sunday and finished at 8 p. m., with only an hour for luncheon. I have had the number of movements of the levers recorded for 24 hours in the 244-lever frame and it will probably surprise you (as it did me) when I say it amounted to no less than 15,800 or nearly 11 movements every minute.

"The frames are made with Stevens locking; not, however, with the tappet attached to levers, but to a cam motion that is fixed under the floor plates. The locking is horizontal and the movement of the tappet is only 2½ in. and it can be made any length, even to the back of the tower, if necessary."

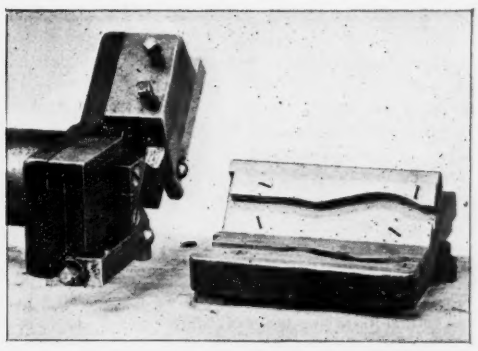


Fig. 5.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
Published Every Friday
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The usual compilations of monthly railroad gross earnings have been published for April. The *Chronicle* finds that the increase over last year was only 3.41 per cent., and *Bradstreet's* finds it only 3.5 per cent. In March the increase had been 4.42 per cent. The April comparison, however, is made with a month in which gains had begun to show themselves last year; in April, 1895, there was an increase of 4.65 per cent. over 1894. In January, of this year, the increase over 1895 was more than 11 per cent., and in February it was nearly 14 per cent., and the failure to sustain the increase of those months is one of the discouraging features of the times. The April increase is largely, if not almost entirely, due to the heavy grain movement. At the Western primary markets for the five weeks ending May 2, there was an increase of nearly three million bushels of wheat, and nearly four million bushels of corn. Altogether, the receipts of wheat, corn, oats, barley and rye in those five weeks were 31¼ million bushels against only 21¼ million in the five weeks of the year before. The grain receipts at Chicago were much larger than in 1895 and slightly larger than in 1894; and in the live stock movement at Chicago there was also an important increase. The receipt of hogs at Chicago was 608,674 head in April, 1896; 485,526 in April, 1895, and 559,936 in April, 1894. The carloads of all live stock received were 21,765 in 1896, 17,729 in 1895 and 23,876 in 1894. On the other hand, the Southern and Southwestern roads are suffering from a falling off in cotton movement, the result of the short crop. The railroads that show gains for the month of over $100,000 are the St. Paul, $312,408; the Great Northern, $256,359, and the Canadian Pacific, $197,379. On no road was there a decline of as much as $100,000.

On the Minneapolis, St. Paul & Sault Ste. Marie the firemen are not hired by the company, but by the individual enginemen. This plan, which was briefly explained in the *Railroad Gazette* of Feb. 8, 1895, page 88, has now been in operation more than a year and a half, and the officers of the road are so well pleased with it that they think of trying it in the train service—that is, of allowing each conductor to engage his own brakemen. The regulations adopted when the status of the firemen was changed have proved so satisfactory that no important changes in them have been found necessary, though a revised schedule, embodying a few minor changes, has recently been adopted. The distinctive portion of this schedule appears in another column of this issue, to which is added an extract from another part of the circular to the enginemen, telling how the Brown discipline is administered on that road. The general manager of the company, Mr. Underwood, informs us that not only is he well satisfied with the plan of hiring no firemen directly, but he believes that the efficiency of the men has been improved. Every engineman has a strong incentive to secure a fireman who will work in complete harmony with himself; and changes, due to increase of business or other cause, are frequent enough to give enginemen a reasonable opportunity to better themselves in case a fireman is not entirely satisfactory. We noticed recently in a Minneapolis paper a rumor that some of the firemen were more or less dissatisfied with their lot, but we cannot learn that this report indicates anything serious regarding the force as a whole. The officers of the road have received no complaint, nor any intimation of any. During the rush of business incident to the heavy grain movement last autumn about one-quarter of these unofficial firemen were engaged as enginemen, with satisfactory results. With the somewhat novel modification of the Brown discipline described in the circular which we copy, and the new arrangement for engaging brakemen, the discipline of the Soo Line will be in some degree unique and railroad superintendents will watch its progress with interest.

The Railroads' Argument in the Joint Traffic Suit.

The main argument for the railroads in the suit of the Government against the Joint Traffic Association will be found, condensed, in another column of this paper. The reader may think this summary pretty long, but even these four columns fail to suitably reproduce the force of the original.

Mr. Carter, like Mr. Macfarlane, devotes much space to the question of jurisdiction and other points hinging upon legal technicalities, and these we do not take up. On the merits of the question it is needless to say that we regard the argument of the defense much the stronger, for we have long held the views here presented. Mr. Carter groups the different points with great force.

On the most vital question—vital if one tries to put himself in the supposed attitude of the prosecution—the question whether the agreement empowers the Board of Managers to exercise complete control over rates on competitive freight, he presents a most convincing refutation of the Government's claim. No road is bound, except in a very loose way, to carry out the recommendations of the managers; any road may make independent rates on 30 days' notice; all may compete in facilities as strenuously as they please; and all this without withdrawing from the agreement. No road is bound to give up any of its earnings to another, and the whole aim is, not to stop competition, but to make it open and above board. The history of the Association during the past four months has, so far as the acts of the Board of Managers may be judged by the theory of the agreement, fully confirmed what Mr. Carter here states. A meeting of the Board of Managers is truly a conference for open and fair competition. These nine men are not judges, deciding questions for litigants who appear before them, and coolly ignoring the strifes of competition; neither are they czars, imposing decrees without giving reasons; but each is an advocate, always strenuously standing up for his own road against the other eight. This remains true even when the Board is dealing with a question of competition with some road outside the Association. While not susceptible of proof, within the brief space of an ordinary argument, the fact is that the circumstances and conditions which still impel each road to actively compete with the rival lines parallel to it are so numerous and strong that there is no likelihood, even remote, that any road will fail to constantly be on the lookout, in the managers' meeting, to get for itself an increase of its share of the competitive traffic. The total quantity of such traffic will not for a long time be sufficient to give every road all it wants.

Mr. Carter's argument that the agreement is not a pool and that no party to it would have even a fighting chance to enforce any claim to any share, large or small, of any of the traffic which the agreement covers, is as strong as the other one just noted, and both of them are the stronger for being mostly statements of fact. The two together fully answer, we think, the claim that the agreement in itself contravenes the laws cited—the Interstate Commerce Act and the Anti-trust Act.

On the broader question, whether the roads have the power, by some hokus-pocus, in spite of the letter of the agreement, to impose such an unreasonable restraint upon commerce that they would be guilty of an offense against the public under the common law, the defendant's brief fortifies the argument with long extracts from the Interstate Commerce Commission's annual reports, which show the great difficulty that has always beset the railroads in trying to get merely living rates, let alone exorbitant charges. The reader may at first wonder how it is that the Commission, which is the real complainant in this case, can thus be quoted against itself; but the explanation is to be found in the fact that the opinions cited by the railroads were uttered when Judge Cooley was the chairman of the Commission. A different motive now prevails.

The present ruling spirit in the Commission is again put in an unpleasant, not to say discreditable light, where Mr. Carter alludes to the failure of the Commission to even attempt to exercise its own functions, to get at the real nature of the Joint Traffic Association, before the Court was appealed to. The most distinctive function of the Commission is to give publicity to such questions affecting the relations of railroads and shippers as would otherwise be kept from the light, either on account of the inability of aggrieved parties to prosecute their suits or the difficulty of framing an issue to present to the courts; but in this case the request to the District-Attorney neither stated reasons for the belief that the Association was an unlawful body nor explained why the Commission did not itself attempt an investigation. The moral obligation resting upon the Commission to fully explain these points to the public was as definite as any duty ever imposed upon it.

Annual Reports.

Norfolk & Western.—The report of the Norfolk & Western for the first year of its receivership is of peculiar interest as indicating the policy of the Receivers and at the same time the financial possibilities of the road. Unfortunately the present showing does not really prove what the company can do under normal conditions, because several factors have combined to depress earnings during the year of 1895. Chief among these was the coal miners' strike in the Pocahontas coalfields, which began on the first of May and lasted about five months, and had a very serious effect on the traffic of the road until toward the end of the year, when conditions again took a favorable turn. The Norfolk & Western is preeminently a coal-carrier and such a stoppage of this class of freight has immediate and disastrous results, as the figures of the report clearly show. Coke and coal carried fell off from 4,904,908 tons in 1894 to 4,142,037 tons in the last year, a loss of 762,871 tons. This was probably due directly to the Pocahontas strike, for until that began there was a large increase in the coal traffic over previous years, the tonnage of the first four months of 1895 being 330,815 tons in excess of that of 1894. During the five months of the strike the coal traffic fell off 919,977 tons, and even in the last months of the year when the strike was over there was still a shortage of 125,359 tons as compared with the preceding year.

The financial results of the whole year's operations are as follows:

Gross earnings:		
Passenger	$1,197,977	
Freight	7,696,384	
Miscellaneous	467,726	
Total gross earnings		$9,662,087
Operating expenses (including taxes)		7,523,636
Net earnings		$2,138,451
Other income		36,289
Total income		$2,174,690
Disbursements:		
Interest on funded debt	$2,994,718	
Rentals, etc	144,931	
Total disbursements		$3,139,649
Deficit		$964,959

This is a large deficit, but to bring it to the actual figure we must add $289,733, which was charged to income account from Jan. 1, 1895, to Feb. 6, when the road was turned over to the Receivers, making a total deficit for the year of $1,254,692.

The two main subsidiary lines controlled by the road, viz., the Roanoke & Southern and the Lynchburg & Durham, did only fairly well during the year. The former succeeded in raising its earnings to $221,040, leaving net earnings, over operating expenses and taxes, of $40,590, which is a slight gain over 1894; the latter road had $159,997 gross earnings, but its expenses and taxes amounted to $161,633, leaving a deficit of $1,636, a loss of about $8,000 from the results of 1894.

Comparing the operations of the Norfolk & Western for 1895, with the three years preceding, we have the following table:

	1895.	1894.	1893.	1892.
Mileage	1,570	1,567	1,556	1,508
Gross earn	$9,662,087	$10,340,452	$10,032,618	$9,952,881
Operating exp. (inc. taxes)	7,523,636	7,693,915	7,199,460	7,031,673
Net earn	2,138,451	2,646,547	2,833,158	2,921,208
Per cent. Oper. exp. to earn	78	74	72	70.65
Final bal. Deficit	1,254,692	325,575	99,942	303,688

This table shows how much the road has suffered in the past year and more than this what a hard struggle it made to keep its head above water in the face of misfortune for the three years previous to the receivership. The Norfolk & Western is one of the roads which must in the nature of things be run on a narrow margin of profit. The last four years, the freight earnings have averaged over 80 per cent. of all earnings, and the freight rate is about the lowest in the United States. Below are the rate, the cost and the profit in *cents per ton-mile*, for several years:

	1895.	1894.	1893.	1892.	1891.	1890.
Rate	0.466	0 451	0.514	0.537	0.548	0 571
Cost	0.358	0.331	0.362	0.379	0.361	0.379
Profit	0 108	0.120	0.151	0.158	0.187	0.192

The average rate of the Chesapeake & Ohio for 1895 was 0.425 cent per ton-mile. That of the Buffalo, Rochester & Pittsburgh was 0.466, and of the Fall Brook (entire system), 0.474.

In 1885 the ton-mile rate of the Norfolk & Western

was 0.741 cent and the estimated profit was 0.298 cent. These figures show better than anything else could how hard is the struggle for life of a road that carries little but coal and that must carry that in the face of fierce and able competition.

In 1892 a dividend of 2½ per cent. was paid on the preferred stock, but since that time no dividends have been declared on either preferred or common stock. In addition there has been default on the coupons for 1895 of several of the junior mortgages. But in spite of this financial situation there is good reason to expect that the reorganization under the plan discussed in the *Railroad Gazette* for April 10 will be speedy and successful.

Among the more important features of the year have been the following: Shortly after the Receivers took the road they leased the plant of the Roanoke Machine Works, and have operated it as part of the property since March 27, 1895. During the first three months of the year the Pocahontas Coal Company acted as selling agent for the coal shipped over the Norfolk & Western, and its earnings were paid over into the gross earnings of the railroad company. Since April 1, 1895, however the Pocahontas company has given up the business of selling coal, and now does simply a wharfage and lighterage business for the railroad.

Railroad Expenditures for Improvements and Equipment.

We have tried to collate in the following article certain facts of interest to manufacturers and contractors regarding recent expenditures by railroad companies for improvements and new equipment, and of the expenditures likely to be made in the immediate future. The facts are not given as being new. Most of them have been published in our reviews of the annual reports of the individual companies, and in other columns, from time to time, but in this summary they make a convenient and suggestive record.

So far this year the railroads have been earning more than they did last year, and much more than two years ago. A large proportion of these increased earnings will go to pay for improvements which could not be made in the last two years, because of scanty income.

The recent reorganizations of the large roads which have been in the control of receivers, provide for the expenditure of large sums to improve those properties. These lines include some of the most important lines in the country; the Southern, the Erie and the Atchison, which have been successfully reorganized, and the Norfolk & Western, the Northern Pacific, and the Philadelphia & Reading, which soon will be. The Baltimore & Ohio is using receivers' certificates to make very extensive improvements.

Northern Pacific.—The reorganization plan of this company, which has been declared in operation, makes liberal provision for betterments, equipment, new construction, etc., reserving $25,000,000 of the prior lien bonds for this purpose, of which not more than $1,500,000 is to be expended in any one year. The Receivers, in their report, dated September, 1895, estimated $9,000,000 as needed for extraordinary expenditures in the next five years.

The improvements for which this sum is required are given by the Receivers as follows: For reduction of grades, $1,500,000; for bridge renewals, $3,600,000; additional terminal and other facilities, $1,000,000; new rails (less the value of rails taken up), $2,500,000, and for perfecting right of way and purchasing tide lands on Puget Sound $485,000. Going further into the items of which these sums are made up, the Receivers state that during the next five years it will be necessary to renew 1,400 miles of rail in the main line to put the track in first-class condition, at a probable cost of $4,000,000, including ballasting. The replacing of the temporary wooden bridges with earth fills or steel bridges, a work which should be extended over a long series of years, making no extraordinary charge in any one year, will require $3,600,000, as given above. A number of heavy locomotives are necessary, and considerable sums should be spent for heating and lighting passenger cars. The Receivers do not think that any additional freight equipment will be necessary for a long time.

The company now has 18,620 freight cars, of which it appears that 33 per cent. are equipped with automatic couplers and 85 per cent. with air-brakes. Last year the cost of air-brakes and steam-brakes on locomotives was $16,000, against $23,000 in the previous year; for air-brakes on cars the receivers spent $31,000, against $26,000 spent in 1894. Large sums for machinery and tools have been spent in both years, $40,000 in 1895 and over $43,000 in 1894.

Canadian Pacific.—At the annual meeting of the company's shareholders in April last the directors were authorized to make improvements involving $1,545,000 to be provided for by new capital. This sum included about $300,000 for equipping the company's locomotives and cars with air-brakes and automatic couplers; $604,000 for replacing the original timber structures of the company with permanent bridges. While most of these bridges have been replaced the work still remaining to be done includes a number of structures of an expensive character. A third item is one of $641,000 for improvements in permanent way, additional terminals at Montreal and Toronto and additional rolling stock. President Van Horne states that it will be necessary to make considerable additions to the company's freight car equipment. No extension of line is planned beyond one of about 23 miles on the Montreal & Ottawa road and a further extension of the same line about 41 miles further to Ottawa at some future date.

Chespeake & Ohio.—General Manager Stevens in the last annual report shows the proportion of the equipment having air-brakes and couplers. This is the second of all those reports we have looked over which makes any definite statement as to the number of cars which the company will be required to equip with safety appliances, although a number of companies do make more or less careful estimates of the expense of such equipment. It appears that all the 355 locomotives in the company's service on June 30 last were equipped with air-brakes, excepting nine; that all of the 212 cars in passenger service were equipped with air-brakes and automatic couplers, and that of the 13,808 cars in freight service 4,534 had air-brakes and 4,195 had automatic couplers. During last year 180 freight cars were purchased at a cost of $80,000 to replace old cars, many of which were of small capacity; all the new cars were of 30 tons capacity.

For several years past unusually large sums have been spent for new equipment, improvemrnts to the roadbed, as well as new branches and extensions of double track, and it appears that no further new construction work of this nature is in progress on the main line or is proposed. Maintenance of way charges showed an increase of $66,000 and maintenance of equipment charges over $145,000. How liberal expenditures on equipment were is shown by a statement that the maintenance of freight cars alone cost $587,620, over $42 per car; maintenance of locomotives cost $341,000, or nearly $1,000 a locomotive, and passenger cars $170,000, or $800 a car. During the year 1,083 tons of 100-lb. rail and 3,200 tons of 75-lb. rail were put in the track. Plans have been completed for some time for a new passenger station and terminals in Richmond, Va. This workwill be started as soon as the city authorities agree to the plans. These improvements will cost about $2,000,000, and include a new station building, elevated road through the city to reach the building, and other changes in the terminals.

Lehigh Valley.—Since the working of the Lehigh Valley was taken back by its own directors and officers after the eventful lease to the Philadelphia & Reading, the company has made extensive improvements, and more especially has made large additions to its rolling stock. During the last fiscal year ending Nov. 31, 2,000 cars were purchased and also 50 locomotives from the Baldwin Works. Since the annual report was issued, the company has ordered 1,000 more cars and has received bids for additional 25 engines. Other equipment added in 1895 included 364 coal cars and 126 other cars. The equipment of locomotives with driver and train brakes is being done gradually. A new building has been built at the Packerton shops, to be used in fitting air-brakes to old freight cars.

The Easton & Northern road is being extended 4 miles at Easton, to give the main line the traffic from the slate quarries in Northampton County, Pa., $300,000 in 4½ per cent. guaranteed bonds being issued to pay for construction. The Depew & Southwestern is being built northwest of Buffalo to Tonawanda 10 miles to expedite the movement of traffic to and from Suspension Bridge. The Lehigh & Lake Erie has been incorporated this last week to build a 10-mile line, to give a shorter connection to the company's large yards at Tifft farm, near Buffalo. The lease of the Southern Central, 117 miles, has been readjusted; the Middlesex Valley, in New York State, 29 miles, has been purchased, and the Elmira, Cortlandt & Northern, 118 miles, has also been purchased since November. It is to be presumed that on these lines considerable expenditures will be necessary.

The references to projected improvements are, for the most part in general terms, but much work is to be done to give facilities to handle a rapidly growing traffic economically and expeditiously. Last year's tonnage was the largest in the company's history, the ton-miles increasing 25 per cent. The increase would have been larger but for lack of power and rolling stock. Now that the new equipment needed is being supplied, additional second track sidings become urgent.

The mileage of new passing sidings and sidings to reach manufactories built in 1895 was considerable, and similar work will be done this year, but the weight of rail used or the actual mileage is not given. Additional main tracks are needed on the Lehigh Division, between Mauch Chunk and Easton. The company now has a second track on its through line, but a comprehensive plan for providing additional track facilities must be considered. The officers believe that with a traffic movement equal to that of last year the interest on the cost of such improvements would be saved "many times over."

The Jersey City yard, having about reached the limit of its capacity, the development of the property at Constable's Hook is necessary. Plans have been prepared for a new yard at Packerton for west-bound trains and for enlarging the yard at Mahoning for east-bound business. Seven new station buildings were built in 1895, and a new passenger station is to be put up at Rochester, N. Y., in the enlargement of the terminal facilities there. A stone building will be built at Pittston, Pa.

Three trestles on the Bowman's Creek bridge have been filled and the banks widened, and two others replaced by three and two-span iron bridges respectively. The iron bridge across the Lehigh River, below Mauch Chunk, has been practically rebuilt.

The Hall signals are being extended, and by June 1 both main tracks between Easton and Caxton will be protected by these signals.

Boston & Albany.—All the company's cars are now equipped with vertical plane couplers and power brakes to comply with the safety appliance law. During 1895 the company put automatic couplers on about 85 per cent. of its merchandise cars and power brakes on 46 per cent. of such cars in order to complete this work. All engines have driving-wheel brakes; at the beginning of 1895 there remained only nine per cent. of the total engine equipment without such brakes. During the last year 27 large locomotives were purchased from the Schenectady Locomotive Works. In the previous year 10 locomotives and 1,000 cars were bought, costing $637,000.

The most important improvements have to do with the separation of grade crossings. Over $157,000 was spent on such work during the year and charged to earnings, but much has yet to be done. The depression of the tracks between Newton and Auburndale is going on, and with this work completed there will be no grade crossings from Boston to South Framingham, 22 miles. The separation of grade crossings at Natick, now going on, requires the building of an entire new line though that town. During the year the new repair shops at West Springfield, Mass., built at a cost of over $186,000, were put in use.

Boston & Maine.—The additions to equipment last year included nine vestibuled passenger cars; 20 day coaches; 600 freight cars and 23 locomotives, costing about $600,000. The company built in its own shops 23 freight, 4 baggage and 16 other cars. In the previous fiscal year the company bought 26 locomotives and 30 passenger cars. The expenses for maintenance of way included $214,000 for new rails and $217,000 for cross ties. About 6,749 tons of new rails were laid in the main track and 503,000 cross ties. In the separation of grades at Chelsea Bridge in Boston a steel viaduct 1,300 ft. long was built and five other important steel bridges and one stone arch were built during the year. Four new passenger stations and five freight houses were built and the Boston terminal was also completed. The immediate extension of the second track on the Gloucester Branch from Manchester to Magnolia has been authorized and also the reconstruction of the passenger and freight stations and yards at Manchester, the cost of this last work being estimated at $160,000. The cost during the next two years of equipping freight cars and engines with automatic couplers and air-brakes is estimated at about $1,000,000, and will be included in current expenses. The Massachusetts Railroad Commissioners' report shows that but 14 of the 9,000 freight cars owned have air-brakes, and that over 48 per cent. of the 566 locomotives owned are still to be equipped with brakes.

Erie.—The reorganization plan gave the new company ample capital for expenditures, the lack of which had been a constant and serious cause of embarrassment to the old company. Under the plan $5,000,000 of prior lien bonds is reserved for the enlargement and improvement of the terminal facilities, including the elevation of tracks at Jersey City, Buffalo and elsewhere; for additional equipment, for reducing grades, and for improving the wharf facilities at New York City. A further $17,000,000 of the general lien bonds is reserved for similar additions and betterments, new equipment, etc., the issue of these bonds for such purposes being limited to not more than $1,000,000 in any one year. The committee of reorganization estimated the needs of the company for early construction requirements at over $5,000,000, a sum which became immediately available to the new company.

Southern.—This company has spent very large sums since it came into possession of the property of the old Richmond Terminal System. The reorganization plan made available for the company's immediate purposes a fund of $5,000,000. Since the present company came into existence extensive improvements have been made in the roadbed, in adding new equipment and in improving shops and shop machinery. During the year 1895 nearly $475,000 was spent for new equipment, including 11 locomotives, 2 passenger cars and 886 freight cars. Contracts were then outstanding and unfilled for 22 locomotives, 20 passenger cars, 14 mail and baggage cars, 280 box cars and 700 freight cars.

The plans of the old East Tennessee, Virginia & Georgia Company for the large shops at Knoxville, Tenn., have been carried out, nearly $110,000 having been spent in addition to more than $225,000 spent by the old East Tennessee Company before the receivership. Large shops are also being erected at Atlanta, Ga., and more recently work has begun on the machine shops at Salisbury, N. C. Large shops will also be built at Alexandria, Va., giving the company four large machine shops well located for economical operation. At Atlanta land was purchased at a cost of over $120,000 for a new union station, and this building is now being erected.

During 1895 more than 41,000 tons of new rail were purchased, about 25,000 tons of this weighing about 75 lbs. to the yard and about 16,000 tons weighing 80 lbs., and during 1895 these rails were laid at a rate of about 5,000 tons a month, so that they were all in the track in November last.

Norfolk & Western.—This property has for years past been kept in excellent condition, both as to roadbed and equipment, but the reorganization plan which has just been declared operative, like all recent railroad reorganizations, contains provisions for securing to the new company funds for improvements, repairs and new equipment immediately required. The total amount of the new securities reserved for additions to the property and for other improvements, including the construction of side tracks, second track, branch

roads and new equipment is $9,690,000 of first mortgage bonds. This amount is not immediately available, but the reorganization will provide funds amounting to $1,882,000 for improvements and reorganization expenses and commissions.

Philadelphia & Reading.—When the reorganization plan becomes effective the company will receive about $3,000,000 in cash for improvements and additional facilities. The legal proceedings preliminary to the foreclosure are now being taken, and it is presumed that if there are no unforeseen delays the reorganization will go through during the summer. The Receivers in their report for 1894 stated that nearly $1,000,000 a year will have to be provided for a number of years for new equipment, barges, improvements to the roadbed, yards and stations, and to equip the company's locomotives and cars with air-brakes and automatic couplers. Last year over $1,557,000 was expended on these accounts. The Receivers further estimate that about $500,000 of this amount will be required yearly for some years to provide additional equipment. So far this year the company has ordered 1,000 coal cars, 25 refrigerator cars, 250 box cars and 250 gondolas. There is nothing in the report to indicate what proportion of the equipment has safety appliances. The expenditures on the roadbed will be large in the next two years in order to keep the track in good condition. The court has just granted authority to construct two short lines on the North Penn Division, the cost of which is estimated at about $70,000. Hall electric signals were put in in 1894 between Fairmount avenue and Jenkintown, 10 miles, at a cost of over $49,000, and an extension of the signals to Bethayres and Fort Washington has been ordered. The Atlantic City road, 55 miles, is also being equipped with Hall signals.

Columbus, Hocking Valley & Toledo.—During 1895 934 cars were equipped with Hoey's patent drawbar attachment. The new equipment added during the year included 1,000 gondola coal cars of 30 tons capacity and 100 side dump coal cars of the same capacity, all equipped with automatic couplers, the side dump cars and 500 of the gondola coal cars having air-brakes as well.

Union Pacific, Denver & Gulf.—Receiver Trumbull, in his report to the United States Court, says that six new locomotives are necessary for the road, and that during the year he will make special application to the court for authority to purchase these engines. During the year 320 freight cars were equipped with Standard couplers at a cost of $7,788. Three day coaches were equipped with steam heat at a cost of $350, the company now having 20 coaches so equipped. Ten coaches are now lighted by Pintsch gas. During 1895 30 60,000-lb. coal cars, with air-brakes and automatic couplers, were purchased, costing $315 a car; 100 box cars, with air brakes costing $375 a car, and 207 box cars, with air-brakes and automatic couplers, costing $425 a car.

Texas & Pacific.—The company has equipped a number of its locomotives and cars with safety appliances, but much the greater part of this work still remains to be done. It is estimated that the cost of completing the equipment of the rolling stock with air-brakes and automatic couplers will require about $250,000.

For the last few years large amounts of rails have been purchased to replace light-weight steel and iron rails. A 75-lb. rail section has been adopted as a standard. In 1894, 3,000 tons of such rails were purchased and in 1895 11,800 tons were bought. During the present year it is proposed to buy about 9,000 tons of rails of this weight to complete the relaying of the entire line with steel.

The directors have had under consideration the advisability of building an independent line from Sierra Blanca to El Paso, Tex., 92 miles, the company now using the Southern Pacific track between these points. The line could be built at a comparatively light cost, as much of the distance is already graded. Moreover, a much shorter line could be secured, and the estimates made by the directors indicate that the expense of maintenance and interest charges would be less than the rental now paid to the Southern Pacific. However, no decision has been made by the directors, and the matter is not one of pressing importance.

Chicago, Burlington & Quincy.—The item of new construction in the company's last annual report shows expenditures during the year of $580,000. The largest item in this is $152,000 for completing the lines opened in 1894. These were the extension of the Wyoming line and the Big Horn Southern road in Montana. Other important charges during the year were $23,000 for the Nebraska City bridge, $97,000 for new ballasting, $24,000 for new fencing, $51,000 for the new viaduct at Hawthorne, Ill., and over $100,000 for land and right of way. During the same year the company spent $62,700 for equipping its freight cars with air-brakes and automatic couplers and for new machinery.

Pennsylvania.—The improvements that have been started or carried on during the year are quite fully described in the last report, but it is not evident what new work may be proposed by the officers. In making any mention of the work of this company large figures have to be used constantly. Thus, the charges to capital for improvements on branch lines were $1,936,000, the largest item being the Delaware River bridge at Philadelphia. The charge to capital for main-line improvements was $600,000 for new freights cars and real estate. The improvements charged to the general income, involved an expenditure of $1,327,000. These great sums were spent on a large variety of work, eliminating grade crossings at Elizabeth, N. J., extensions of branch roads and second tracking. The straightening of track east of Pittsburgh now in progress will cost about $2,000,000.

Pittsburgh, Cincinnati, Chicago & St. Louis.—The improvements made in 1895 included 9,118 tons of new rails and 400,000 cross-ties placed in track, but the cost of the material is not shown. The most important work begun was the widening of two tunnels on the Pittsburgh Division for double track, and it is the last work required to be done in constructing the double track on the Pittsburgh Division. Twenty new engines were added to replace others condemned or sold, and 392 freight cars were built. Nothing is said of the equipment of cars and locomotives with couplers and brakes.

Lake Erie & Western.—President Brice estimates that $600,000 will be required to apply brakes and couplers to the company's 6,000 cars and 120 locomotives. This estimate is on the basis of $70 a car and $500 per engine for brakes and $20 a car for automatic couplers. In addition, a large sum will be spent for similarly equipping the cars of the Northern Ohio, controlled by the Lake Erie & Western. Both the roadbed and equipment of that line are in poor condition, and $1,000,000 of its bonds have been set aside for improvements. The cars of the Lake Erie & Western are said to be all in good or fair condition. Five of the 119 locomotives are not in service. During 1895, 207 freight cars of various types were destroyed and not replaced. Eighteen miles of 56-lb. rails were replaced with 75-lb. rails, the 56-lb. section replacing 10 miles of iron rails on a branch.

Louisville, New Albany & Chicago.—A good deal of work was done last year to complete the improvements in maintenance of way proposed by the present management some years ago. Large shops were erected at Lafayette, Ind.; 49 miles of 70-lb. rails were laid on the Indianapolis Division to replace 52-lb. rails; 10 steel bridges are being built to replace old Howe structures; the Switz City Branch, 41 miles long, has been changed from narrow to standard gage, and the officers believe that the permanent way is now in a satisfactory and safe condition. Altogether $5,000,000 in new securities have been issued by the present management, all of which except $2,000,000, issued to pay off old indebtedness, has been expended directly in permanent improvements, a sum equal to nearly $6,000 per mile of road.

Louisville, Evansville & St. Louis Consolidated.—The receivers include in the report for the year ending Dec. 31, 1895, a table showing approximate costs of additions and improvements which they estimate it will be necessary to expend in the next 10 years. This includes a total of $280,000 for bridges, of which $66,000 has been so far expended; $262,000 for rails on the main line, $8,000 for the Princeton shops, $15,000 for interlocking, $15,000 for passenger equipment, $70,000 for freight engines, of which about $40,000 has been expended; $232,000 for freight equipment, of which $85,000 has been expended. This latter item is in addition to $250,000, estimated as the cost of equipping freight cars with air-brakes and automatic couplers. The portions of these amounts which the Receivers estimate as "required" in 1896 are $42,000 for bridges; $12,000 for relaying rails and a similar amount for ballasting, and $6,000 for the Princeton shops. The bridge work to be done this year includes $19,000 for metal bridges.

Grand Trunk.—During the half year ending Dec. 31, the company added 1,000 box cars to its equipment, and lengthened and strengthened 246 box and 20 platform cars and did other work, increasing the capacity of its freight car equipment, for which the charges to the capital account were nearly £102,000. The company built as its own shops 10 switching engines, the cost of which was charged to revenue. Over 400 engines received repairs during the half year, 92 receiving heavy repairs. The chief improvements in maintenance of way were laying 8,309 tons of 70-lb. rails and 1,966 tons of 60-lb. rails in the main track and over 5,000 tons of old rails on branch lines and sidings, all on the lines east of the Detroit and St. Clair rivers. On the Michigan lines 593 tons of new rails were laid in the main track.

Lake Shore & Michigan Southern.—This report, while giving full statistics of operations, gives no information as to particular improvements carried out during the year or which may be proposed for early undertakings. From the chief engineer's statement, however, we learn that new rails were laid on 77 miles of road and 460,648 cross ties were renewed, equal to about 175 miles. During 1895, 9,459 tons of rails were purchased at $22 and $23 a ton, and costing $215,725.

In 1895, 30 new engines and 500 new freight cars were added to equipment. During the year the charges for new locomotives were $418,754 and for new freight cars $1,197,200. Repairs of locomotives cost an additional $546,630 and repairs of freight cars an additional $890,534.

Missouri Pacific.—Last year $400,000 was spent in rebuilding freight cars, a much larger sum than in 1894. The cost of equipping 2,535 freight cars with automatic couplers was $22,308 in excess of the cost of ordinary couplers. Basic steel bolsters replaced broken wooden ones. Winslow-Murphy roofs on 2,066 cars cost $72,000. New shop machinery cost $9,000, most of this being compressed air tools.

South Carolina & Georgia.—A very extensive work is being undertaken by the company in the improvement of its water front terminals at Charleston, S. C. This has required the purchase of considerable real estate and the plans also include the construction of a road, two miles long through the streets of Charleston, now practically all built. The company acquired an elevator of 200,000 bushels capacity in certain property purchased at Charleston, and compressors, warehouses and other terminal structures will be added at once.

During the year, 250 ventilated box cars of 30 tons capacity were received. The cars have Westinghouse brakes and automatic couplers. About 200 tons of 70-lb. rails were used for renewals and 700 tons additional were purchased at $24 a ton, to be put in the track this year. Important changes need to be made in the Charleston machine shop and car shops. Some of the machinery is of modern type, but many tools, mostly in the woodworking department, are old and should be replaced by modern tools. Plans have been submitted by the mechanical department for further improvements in the shops.

Oregon Short Line & Utah Northern.—The reorganization plan, which has been accepted by a majority of the security holders, will provide the new company with a large fund for betterments. The plan contains no account of the physical condition of the property or of the improvements necessary. For such purposes and reorganization expenses, however, the new company will secure $1 518,000.

Maine Central.—President Wilson in the report for the nine months ending June 30 last states that when the company's traffic again increases it is proposed to carry out important improvements which have been held in abeyance by adverse pecuniary conditions. No further reference to the projected improvements is made. During the period covered by the report, two engine houses were built; 14 miles of new rails laid; two iron bridges renewed and six pile and trestle bridges rebuilt or filled in, plate girders of 34 ft. and 24 ft. being erected where it was impracticable to fill in the trestle entirely.

Grand Rapids & Indiana.—The foreclosure sale of this road, which will occur during the summer, will place the road more immediately under the control of the officers of the Pennsylvania. With the readjustment of its finances and a closer operating agreement with the Pennsylvania, important improvements which the finances of the company have not permitted it to make will undoubtedly be undertaken. In the last annual report the General Manager points out that marked economies in operation could be produced by proper expenditures, but makes no mention of any special improvements. About 90 freight cars are to be purchased during the year and possibly five passenger cars.

Last year about 3,300 tons of 70-lb. rails were put in the track, about 2,260 tons more than in 1894, and the expenditures for this account increasing $40,000 over the previous year. A good deal of bridge repair was done and about $50,900 was spent on this work.

April Accidents.

Our record of train accidents in April, given in this number, includes 21 collisions, 72 derailments and 1 other accident, a total of 94 accidents, in which 28 persons were killed and 104 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident, as reported, make it of special interest.

These accidents are classified as follows:

Collisions:	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	4	0	0	4
Misplaced switch	0	0	2	2
Failure to give or observe signal	0	0	0	0
Mistake in giving or understanding orders	0	0	0	0
Miscellaneous	3	0	7	10
Unexplained	2	0	3	5
Total	9	0	12	21

Derailments.			
Broken rail	3	Runaway train	1
Loose or spread rail	6	Derailing switch	1
Defective bridge	5	Animals on track	1
Broken wheel	1	Landslide	4
Broken axle	9	Washout	2
Broken truck	1	Wind	1
Fallen orakebeam	1	Malicious obstruction	0
Failure of drawbar	1	Accidental obstruction	3
Misplaced switch	2	Unexplained	27
Bad switching	2		
Bad loading	1		72

Other Accidents.	
Tornado	1
Total number of accidents	94

A general classification shows:

	Collisions.	Derailments.	Other accid's.	Total.	P. c.
Defects of road	0	14	0	14	15
Defects of equipment	4	13	0	17	18
Negligence in operating	12	7	0	19	20
Unforeseen obstructions	0	11	1	12	13
Unexplained	5	27	0	32	34
Total	21	72	1	94	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other accid's.	Total.
Passenger	5	17	0	22
Freight and other	33	56	1	90
Total	38	73	1	112

The casualties may be divided as follows:

Killed:	Collisions.	Derailments.	Other accid's.	Total.
Employees	6	16	0	22
Passengers	1	5	0	6
Others	0	0	0	0
Total	7	21	0	28
Injured:				
Employees	19	30	0	49
Passengers	3	44	0	47
Others	3	5	0	8
Total	25	79	0	104

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road	1	20	11	13
Defects of equipment	0	0	1	2
Negligence in operating	1	3	6	22
Unforeseen obstructions and maliciousness	3	21	3	6
Unexplained	1	3	1	6
Total	6	47	22	49

Sixteen accidents caused the death of one or more persons each, and 21 caused injury but not death, leaving 57 (60 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with March of the previous five years shows:

	1896.	1895.	1894.	1893.	1892.	1891.
Collisions	21	33	37	72	47	67
Derailments	72	75	62	92	86	108
Other accidents	1	9	5	9	10	6
Total accidents	94	117	104	173	143	181
Employees killed	22	17	17	33	30	52
Others killed	6	10	11	2	9	4
Employees injured	49	50	59	93	107	100
Others injured	55	40	29	29	31	49
Passenger trains involved	22	37	30	58	45	53
Average per day:						
Accidents	3 13	3.90	3.47	5.77	4.77	6.03
Killed	0.93	0.90	0.93	1.17	1.30	1.87
Injured	3.47	3.00	2.93	4.07	4 60	4.97
Average per accident:						
Killed	0.30	0.23	0.26	0.20	0.27	0.30
Injured	1.10	0.78	0.84	0.70	0.97	0.82

The favorable record of the first three months of the year is now broken, six passengers having been killed in April. Three of these were on the platforms of the cars (in the derailment at Holeb, Me.) and one was in a freight train. The most disastrous accidents in April were bridge failures, in one of which, at Bedford, Ind., on the 13th, six employees were killed. Near Lumpkin, Ga., a passenger train was wrecked at a burning trestle. No passengers were killed, and the personal injuries were, comparatively speaking, light; but the whole of them might have been prevented if the man who started to flag the train had realized his responsibility. The bridge failure at Toledo, on the 8th, is said to have been due to the derailment of a car in the train, but the cause of the derailment is thus far unexplained. The bridge wreck at Herman, Mo., seems not to have been due to any fault of the bridge. Anyone who likes to calculate annual averages will be interested in the fact that the last serious disaster at this bridge was in 1855, when 22 passengers were killed and 50 injured.

At Lane, Pa., on the 1st, two passenger cars fell down a bank, but only seven persons were injured. A disastrous collision was that near Allegrippus, Pa., on the 23d in which several sleeping-cars were burned up. In this case there was a failure of a coupling or drawbar; but as the cars must have come to a full stop after the breakage, it would hardly be fair to charge the wreck to a "defect of equipment."

The derailment reported in Arizona, on the 14th, will be of interest to the people at Buckeye Park, O., who are going to spend a dollar or two apiece next week to see a collision. Doubtless they will envy the people of Tucson, who saw this smashup for nothing, and had ample time to secure reserved seats without charge.

There were two passenger train wrecks in Canada in April, one at Nepigon and the other near Perth.

There were nine accidents to street cars, electric or cable, in April, and the number of persons injured, so far as we can gather from the reports, was 24, including two cases which were fatal. There were two crossing collisions in New York City, a derailment from a broken axle in Cincinnati, a derailment from too high speed in Long Island City, N. Y., and one caused by a malicious obstructian at Ashland, Pa. The worst accident was one in Bay City, Mich., on the night of the 25th. This was a butting collision of electric cars in which 12 persons were injured, two of them fatally. The details as reported indicate that this is one more example showing the need on electric roads of a few simple lessons that were learned by railroad men a generation ago. The account says:

"Car No. 27 should have passed car No. 28 at Columbus avenue, but mistook another car at that point, which should have been passed at Center avenue, to be the one due at Columbus avenue, and therefore took the single track up Garfield avenue. Approaching the long passing track at Twenty-third street the motorman saw a car, as he supposed, standing on the sidetrack, and kept his car moving. This car proved to be No. 28, which was to have passed No. 27 at Columbus avenue. The cars came together with a terrific crash before they could be stopped, although both motormen applied the brakes and reversed the current as speedily as possible after they saw the impending danger. Car No. 28 contained about 60 people. The other car carried about a dozen. There was a loud crash of glass and broken vestibules, and passengers began scrambling out, some of them going through the windows."

The recent establishment of new fast mail trains to and from St. Louis (by the Baltimore & Ohio Southwestern and by the Wabash) has been heretofore noted in the *Railroad Gazette*. These trains carry passengers and afford important facilities to that city not before enjoyed. This, however, is only one of several improvements lately made in that region. With the spring change of time, made last week, the Missouri Pacific put on a new fast express train from St. Louis to the West, called the Kansas and Nebraska Limited. This train leaves St Louis in the evening, about one hour ahead of the old through night train, and reaches Omaha at noon the next day, making a considerable saving on a trip to the Pacific coast. This train also gives facilities for a quick trip to important towns in southwest Missouri and to Wichita, Kan. On the eastbound trip the new train starts from Omaha at 3:45 p. m. (and from other points at corresponding hours) and leaves Kansas City at 11:10 p. m., arriving in St. Louis at 7:20 the next morning. Between Kansas City and St. Louis the schedule of this train is more convenient than any heretofore made. The Wabash has lately put on a train from Chicago to St. Louis, starting in the afternoon, so that now a St. Louis man can have half of a business day in Chicago without being on a sleeping car more than one night. A similar afternoon train was put on between St. Louis and Kansas City about a year ago, and we understand that both of these experiments have proved profitable.

The plan of rating freight engines on the basis of tons instead of on the number of cars, has lately been adopted on the Baltimore & Ohio Southwestern, and General Superintendent Rawn has issued circulars prescribing the weights with which engines are to be loaded on the different divisions and subdivisions of the road. On the Ohio Division he is so fortunate as to have only two classes of freight engines, so that the table for that division is quite simple. On the Mississippi Division there are four sizes of engines, besides a fifth class of smaller engines used only on the Springfield line. Mr. Rawn makes a slight allowance for the additional length of such trains as have a large proportion of empty cars, by providing that where there are 10 or more empties in a train the weight of each shall be estimated at 15 tons, which, we assume, is probably from 20 to 50 per cent. higher than the average actual weight of the empty cars in service. Where the weight of the lading in a car cannot be accurately determined it is to be estimated, in the case of heavy bulk freight, at 10 per cent. above the marked capacity of the car; in the case of merchandise at 10 tons a car, and for livestock 12 tons. The circular to agents gives a list of estimated weights of empty cars, to be used where the actual weight cannot be readily ascertained.

The Pennsylvania lines west of Pittsburgh announce that hereafter bicycles will be carried in baggage cars on all the company's lines the same as regular baggage, though not more than one bicycle on any one ticket. This rule seems to have been a result of the Ohio law requiring bicycles to be carried free within that state. The circular issued by the company says that the bicycle "will be forwarded on the first train on which it can be conveniently carried." Baby carriages and tricycles are charged for as 50 lbs. each. The circular of the Erie announcing the provisions of the new law concerning bicycles in New York state directs baggagemen to be careful, when a bicycle is checked from a point in New York state to a point in another state (for which a charge is made, the same as before the passage of the New York law), not to surrender it before it reaches its destination. The legislature of Rhode Island has passed a bill requiring all railroads and steamboat companies to transport bicycles as baggage. The press dispatch conveying this information states that heretofore the charges in that state for carrying wheels have been very high; so high, we presume, that they sometimes toppled over into Massachusetts or Connecticut.

The movement to secure the amendment of the Interstate Commerce law so as to abolish the clause inflicting imprisonment as a penalty for unlawful variation of rates has, within the last month, taken the shape of two new bills, House Bill 8536 and Senate Bill 2967, abolishing imprisonment of agents and imposing a fine upon the railroad company of $15,000 for each offence. The Brown decision has, however, produced a marked change in sentiment in various quarters, and there is a good deal of opposition to these two bills. The Trades League of Philadelphia has formally protested against them, and a strong minority of the House Committee disapproves them. On May 15 the committee requested the House to return its bill to the committee for further consideration; but four days later this action was rescinded by a vote of 10 to 4 and the bill now stands on the calendar. The committee will, however, hold further hearings, and has invited members of the Interstate Commerce Commission, Boards of Trade and other interested persons to appear and be heard with reference to the bill.

NEW PUBLICATIONS.

Johnston's Electrical and Street Railway Directory for 1896. The W. J. Johnston Co., New York. Price, $5.

This is a volume of 822 octavo pages. It comprises lists of electric light central stations, prices paid for city lighting, isolated electric plants, street railroads, telephone companies, telegraph companies and district messenger companies throughout the United States, Canada, Mexico, Central America and Cuba. Following this are given manufacturers of and dealers in electric and other supplies. This is the first edition of the work and a number of errors occur; however, in a book of this sort, some errors are to be expected, and we presume that subsequent editions will be revised and corrected.

The list of central stations occupies 125 pages and gives the names of the companies, the towns arranged alphabetically according to their states, the names of the officers, the amount of capital paid in, the electric system used and the number of arc and incandescent lamps lighted by each company. An asterisk indicates that the company has a contract for city lighting, and a dagger, that the company furnishes current for power purposes, the number of H. P. that it supplies being given. Following this are 22 pages giving prices paid by cities for lighting. As much of this has been embodied in the previous list, it would seem that it would be better to combine the two, reducing the number of pages. In neither of these lists are given the street addresses of the companies or officials. This information is always convenient and is especially so if the company is in a large city.

The list of isolated plants covers 255 pages. As mentioned in the head note, this is probably the least accurate, as the owners of private plants have little interest in replying to inquiries. This is followed by names of mining companies using electricity with the names and addresses of the officers.

The list of street railroads occupies 54 pages. The legal title of the company is given, followed by the name and title of the managing officer. Other important officers are given with their titles, but the street addresses of the offices are omitted. An asterisk indicates that the system used is electric, and as stated in the head note, "unless otherwise noted herein, all other companies use horses." From this we are obliged to believe that, contrary to our former ideas, the cars of the Manhattan [Elevated] Railway Company of New York are drawn by horses. The number of its cars is given as 122. Any one who has watched for a few moments the trains pass on the elevated will know that this is an error. Poor gives the number as 1,122.

Following this are the telephone companies. These are in three divisions. The first of these is said to be the latest official list, corrected to Oct. 1, 1895, of the local telephone companies operating under the American Bell license. Its arrangement, however, is obscure. The second list gives the companies incorporated to operate as competitors of the Bell Company, and the third list is a supplement to the second, giving companies which have not been heard from, although some of them are probably doing business. After this are given the telegraph companies and the district messenger companies. A list is given of electrical associations and societies throughout the United States and Canada, the officers and the club address being given.

There are three lists, occupying 382 pages, giving manufacturers and dealers, mostly of electric supplies. The first is arranged geographically by states, cities or towns; the second according to lines of business and not geographically, as stated in the heading, and the third, alphabetically.

TRADE CATALOGUES.

The Stow Flexible Shaft.—The Stow Manufacturing Co., of Binghamton, N. Y., has just issued a new edition of its illustrated catalogue. It is not necessary for us to say a word about the Stow flexible shaft in general. The combination of the flexible shaft and electric motor is said to have made great advances in the past year; a large number of these have been put in use, and no complaint has yet been received. An outfit of this kind has recently been designed for street railroad use, particularly for drilling rails. It is compact, with covered gears, and weighs but 20 lbs. and will drill holes up to 1 in. in diameter. The outfit consists of a truck, rheostat, starting and stopping box, reduction gears, insulated wire sufficient to connect with trolley wire, attached to a pole 13 ft. long with a connection at the end. This apparatus is sold for $306. Another new development is the radial flexible drill for use in bicycle shops. This is a modification of the radial flexible boring machine heretofore made, especially adapted for bicycle shops. It hangs from the ceiling and will drill almost anywhere within a circle of 20 ft., so that any number of frames that can be placed within this space can be drilled without moving them.

Discipline of Enginemen and Firemen on the Minneapolis, St. Paul & Sault Ste. Marie.

On December 1 last this company issued the following revised letter to enginemen, confirming the plan, begun in 1894, of paying each engineman for both himself and his fireman.

DEAR SIR—From date the railway company concedes you the right to hire, fix the compensation of, dismiss, or discipline your firemen, under the following conditions:

1. No man can take service as fireman (except in case of an emergency) unless he be over 21 or under 35 years of age, in sound health, furnishes a certificate of good character and passes the prescribed color and educational tests.

2. Engineers will not employ a fireman whose surname is the same as their own or who may be obnoxious to the company.

3. All rules and regulations for the government of firemen on duty will be promulgated by the engineer. No officer of the company will exact of firemen any specific duty.

4. Should they choose, engineers can hire a fireman who has been dismissed by an engineer, unless the discharge was based on a sufficient reason to debar the fireman from further service.

5. Inasmuch as the names of firemen do not appear on the company's pay roll, engineers desiring meal tickets for their firemen will be held responsible for them.

6. When an engineer desires to take service as a fireman, the engineer having the junior fireman will be asked to suspend him, that an engineer may have the place. He has the right to decline to do so, if he choose, without prejudice; in such case, the engineer having the next junior fireman will be asked to suspend his fireman that an engineer may have the place; should he decline, the engineer having the next junior fireman will be

asked to suspend his fireman, as above: should he decline, the company will make no further effort to furnish the engineer employment as fireman; but whether he finds such employment or not, his seniority and standing as an engineer are not affected.

7. Paymaster's checks will be made out in the name of the engineer in an amount to cover the services of himself and fireman, and the checks will be so divided that if the engineer chooses, he can, by proper endorsement, transfer to his fireman a check, thereby saving himself the inconvenience of handling currency.

The company hereby agrees that it will not make an engineer from a fireman unless the fireman is nominated by the engineer for whom he is firing, and the nomination seconded by two other engineers; such nomination and seconding rendering him eligible for examination by the Superintendent (or his representative), and the Mechanical Superintendent, at which examination the engineer who nominated him, and the second, may, any or all of them, be present; should this be inconvenient, they may select an engineer to represent them.

Locomotive engineers will not be hired (except in cases of emergency or by mutual agreement) unless they be recommended in writing by three full pay engineers in service.

[Then follows the schedule of wages per mile, and of allowances for overtime. These latter take effect after 11 hours' service, 12 hours, 14 hours or 15 hours, according to the circumstances of different divisions. Next come the usual conditions concerning exceptional service, roundhouse work, etc, followed by a modified form of the Fall Brook plan, which is described as below.]

The credit system, effective Dec. 1, is as follows:

Suspending enginemen for minor derelictions of duty will be abandoned and in its place the plan of giving credits for good service, and debits for bad; allowing the accumulative credits to offset the debits when possible. This arrangement is intended to give permanent and continous employment to men now in the service. It is hoped that other good results may develop from its adoption. The system is based upon general meritorious service, with excellence in the following special directions:

1. Punctuality of trains when the time is made and the speed limit is not exceeded. 2. Economy in fuel and lubricants and cost of repairs per 1,000 miles run. 3. Freedom from sectional collisions. (A sectional collision is one where a train breaks apart, and a collision of the several sections occurs.) 4. [Freedom from] the killing of live stock. 5. A freedom from disagreements with other employees of the company, when in the discharge of their duties, who are not subordinate to engineers. 6. [Freedom from] damage to persons and property caused by rough handling of trains. 7. Non-affiliation with labor organizations under whose by-laws strikes can occur. 8. An act of heroism or the use of good judgment in an emergency. 9. A special act of merit or loyalty for the good of the service.

Credits cannot, under ordinary circumstances, apply to damage caused by

1. Incorrect use or misunderstanding of telegraphic train orders. 2. An ignorance of current book or time table rules, whereby damage to persons or property results. 3. Intoxication when on duty. 4. Rear end collisions, whether on road (when properly signaled) or in station limits. 5. A violation of the rules governing any movement of trains at stations, railway crossings or drawbridges. 6. Interference with or dictation to any employees (not subordinate to an engineer) as to the performance of their duty. 7. Dishonesty or conspiracy prejudicial to the revenue of the company or its reputation.

The credit account will be inaugurated as follows:

Dec. 1, 1895, all engineers then in service who have been in the employ two years will receive a credit of 60 days. For a less term than two years a proportionate credit will be given, and for each year of good service from that date, a credit of 35 days will be given. Especially meritorious service will procure such additional credits as the management may decide. When an engineer becomes subject to discipline, his credits shall be decreased to the extent deemed advisable. If he has no credit, he will stand suspended the number of days that would have been taken from his credit, had he one. Each engineer will be informed in writing the number of days he may receive either to his credit or debit, and in case he is dissatisfied with the ruling, he can appeal, without prejudice, to a committee consisting of the Mechanical Superintendent (or his representative) and the Superintendent (or his representative). The record books will be kept in the offices of the Superintendent and the Mechanical Superintendent, and each employee whose name appears therein will have the right, at any time, to inspect his individual record, but not the record of any other employee.

When by reason of slack business it becomes necessary to reduce the force, the engineers with the best records will be given preference.

Inasmuch as the credit and debit system is an experiment, and has not been worked to a conclusion, it is subject to change whenever it bears unjustly on employees affected by it, or the company, and that, so far as practicable, it may attain perfection, criticisms and suggestions are invited. They should be made in writing to the head of the department concerned.

Train Accidents in the United States in April.

COLLISIONS.

REAR.

3d, on Baltimore & Ohio, on the bridge over the Ohio River, at Bellaire, O., an empty engine ran into some freight cars which had become detached from a preceding train and were running back down grade at considerable speed. Two men climbing up the ladder of the caboose of the freight were killed and 2 others were injured.

11th, 11 p. m., on Erie road, near Port Jervis, N. Y., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, derailing 2 cars. These cars fell upon the westbound track immediately in front of Wells-Fargo express train No. 13 and that train was badly wrecked, the engine falling down a bank; engineman and fireman injured, the latter very badly.

13th, on Grand Rapids & Indiana, at Fort Wayne, Ind., a freight train descending a grade broke in two, and the rear portion afterward ran into the forward one, wrecking several cars. A brakeman was injured.

13th, night, on Missouri Pacific, near Herman, Mo., a freight train ran into the rear of a preceding freight which was on the bridge over the Gasconade River, and the caboose and two freight cars fell, with one span of the bridge, into the river. Three tramps were injured. In the year 1855 a passenger train fell into the river at this point, and 22 passengers were killed.

15th, on Atchison, Topeka & Santa Fe, at Larkspur, Col., a freight train broke in two, and the rear portion afterward ran into the forward one, wrecking several cars. A brakeman was injured.

20th, on Texas, Louisiana & Eastern, near Waukegan, Tex., a mixed train broke in two, and the rear portion afterward ran into the forward one, damaging two cars. Two passengers were injured.

24th, 1 a. m., on Pennsylvania road, near Allegrippus, Pa., a freight train ascending a steep grade broke in two and the rear portion, consisting of several empty sleeping-cars, ran back into the head of a following freight, making a bad wreck. The sleeping-cars took fire and were burned up. One engineman and one fireman were fatally injured, and the porters of the sleeping-cars were hurt.

And 2 others on 2 roads, involving 4 freight trains.

CROSSING AND MISCELLANEOUS.

8th, on Southern Railway, at Galveston, Va., collision between a passenger train and a freight, derailing and wrecking several freight cars: 3 trainmen injured.

21st, 4 p. m., on Reading & Columbia, near Manheim, Pa., a freight train ran into a freight car which was standing upon the main track, and the engine and several cars were overturned and wrecked. A brakeman was killed and 5 other trainmen injured. The car which was run into had escaped from a siding at White Oak on the Lebanon & Cornwall road, four miles distant. It is said that it was blown out of the siding by a high wind.

22d, near Mt. Vernon, Ind., a fruit train of the Louisville & Nashville ran into a passenger train of the Evansville & Terre Haute at the crossing of the two roads, derailing 2 passenger cars and wrecking one of them. A passenger brakeman was killed and the engineman and one brakeman of the fruit train were injured.

24th, on Philadelphia & Reading, at 16th street, Philadelphia, several cars of a switching train became uncontrollable and collided with the engine of another switching train, making a bad wreck. One fireman was injured.

26th, 10 p. m., on Pittsburgh, Cincinnati, Chicago & St. Louis, at Dayton, O., a passenger train was run into by 5 coal cars which had escaped control on an adjoining track of the Cincinnati, Hamilton & Dayton, and one sleeping-car was badly damaged. One passenger was killed and another injured.

And 7 others on 7 roads, involving 2 passenger and 11 freight and other trains.

DERAILMENTS.

DEFECTS OF ROAD.

1st, on Pennsylvania road, near Lane, Pa., passenger train No. 33 was derailed on a curve and a passenger car and a mail car were overturned and fell down a bank. The mail car took fire, but the flames were soon extinguished. Four passengers and three trainmen were injured, one of the passengers fatally. It is said that the derailment was due to a broken rail.

1st, on Georgia & Alabama, near Lumpkin, Ga., passenger train No. 17, consisting of an engine, baggage car and two passenger cars, fell through a trestle which had been weakened by fire. Five passengers and five trainmen were injured, one passenger badly. Some farmers near the trestle discovered the fire, and they sent a negro to stop the train, but he went into a house to shelter himself from the rain, and allowed the train to go by him.

8th, 4 a. m., on Wheeling & Lake Erie, at Toledo, O., a freight train broke through a bridge, and six cars, including a heavy derrick car, fell into the Maumee River. A brakeman was carried down with the wreck and drowned. A man asleep on the derrick car was injured. It is said that the failure of the bridge was due to the derailment of a car, from some cause unknown, which ran against a post of the truss, knocking it out.

13th, 9 a. m., on Bedford Belt road, near Bedford Junction, Ind., a train consisting of an engine and one platform car broke through a trestle and fell to the ravine 50 ft. below. Six employees were killed and one injured. The bridge was undergoing repairs, and the train was moving very slowly; but it appears that the carpenters had loosened some longitudinal braces to a dangerous degree.

14th, 3 a. m., on New Orleans & Northeastern, near Vosburg, Miss., a passenger train broke through a trestle which had been weakened by a freshet, making a bad wreck. Eleven passengers were injured.

15th, on Erie road, near Geneva, Pa., a freight train drawn by two engines was derailed at a point where the track was being repaired, and 17 loaded cars fell down a bank. The trainmen all jumped off, and an engineman and a brakeman were killed. Four others were injured. A coroner's jury held the track foreman responsible for the derailment, too many spikes having been removed.

27th, 1 a. m., on Pittsburgh, Cincinnati, Chicago & St. Louis, at Cincinnati, O., a freight train was derailed by a loose rail and the tender was overturned. Two brakemen were injured.

And 7 others on 7 roads, involving 7 freight trains.

DEFECTS OF EQUIPMENT.

11th, on Philadelphia & Reading, at Locustdale, Pa., a freight train was derailed by a broken axle, and 2 boys riding on 1 of the cars were badly injured. Three other tramps were hurt.

30th, 6 a. m., on Baltimore & Ohio, near Washington, Pa., a passenger train was derailed by the breaking of an axle of the front truck of the engine, the engine being overturned. The fireman was killed and the engineman and express messenger injured.

And 11 others on 10 roads, involving 11 freight trains.

NEGLIGENCE IN OPERATING.

14th, 8 a. m., on Southern Pacific, near Vails, Ariz., the caboose and 13 cars broke away from a gravel train which was switching and ran down grade 18 miles to Tucson, where, a warning having been given, and a switch set, the whole of the runaway train was derailed, and 11 cars wrecked. The news of the expected smash was received at Tucson about half an hour before the cars reached there, and being circulated, a big crowd gathered. The cars came into Tucson at a speed estimated at from 50 to 70 miles an hour, struck the sidetrack, and then the obstructions, and then the air was filled with gravel, car wheels and splinters.

28th, on Atchison, Topeka & Santa Fe, at Colorado Springs, Col., a passenger train was derailed at a derailing switch, approaching a crossing, and both of its locomotives fell into the ditch. Several persons were slightly injured.

And 5 others on 4 roads, involving 5 freight trains.

UNFORESEEN OBSTRUCTIONS.

3d, on Baltimore & Ohio, at Petroleum, W. Va., a passenger train was derailed by a rock which had fallen upon the track and the engine was ditched. The engineman and fireman were injured, the former fatally. The conductor, mail agent and five passengers were also hurt.

20th, on Canadian Pacific, near Holeb, Me., a passenger train was derailed by running into a washout, and the engine, baggage car and first two passenger cars were ditched. Three passengers and the baggageman were killed. The passengers were on the car platforms.

20th, on Lehigh Valley, at White Haven, Pa., a passenger train was derailed by a stone which had rolled upon the track; fireman injured.

23d, on Delaware & Hudson, near Honesdale, Pa., the baggage car of a passenger train was derailed by an obstruction on the track and a brakeman was killed; one passenger was injured.

24th, on Chicago & Texas, near Murphysboro, Ill., a passenger car being pushed by a locomotive ran over a cow on a trestle and the car fell into a river. One employee was killed.

25th, 1 a. m., on St. Louis & San Francisco, near Fredonia, Kan., a passenger train was derailed by a rock which had fallen upon the track and the engine was overturned. The engineman and fireman were injured.

28th, 2 a. m., on Illinois Central, near Raymond, Ia., a passenger train was derailed at a washout and several cars were badly wrecked, two of them being overturned. Fourteen passengers were injured.

28th, on Atchison, Topeka & Santa Fe, near Lakin, Kan., an empty car in a freight train was overturned by a high wind and, with 7 other cars, fell into the ditch.

And 3 others on 2 roads, involving 1 passenger train and 2 freight trains.

UNEXPLAINED.

9th, on York Southern, near Laurel, Pa., a car of lumber in a mixed train jumped the track and, with 3 other freight cars and 1 passenger car, fell down a bank. One passenger, the only one on the train, was slightly injured.

10th, on Pennsylvania road, at Frankford, Pa., the engine of a freight train was derailed and a brakeman was injured.

15th, on Oregon Railway & Navigation Line, near Wallula, Wash., the engine of a freight train was derailed as it passed over a cattle guard and several cars were wrecked. The engineman and fireman were injured.

20th, on Cleveland, Lorain & Wheeling, at Fairpoint, O., a car in a freight train was derailed while running through a tunnel and knocked down some timbers so that a part of the roof of the tunnel fell in. A brakeman was badly injured.

21st, on Great Northern, near Monarch, Mont., a car in a freight train was derailed and a brakeman was killed.

23d, on Southern Pacific, at Sandy Fork, Tex., a freight train was derailed and several cars were ditched. A tramp was injured.

26th, on Louisville & Nashville, at Lebanon Junction, Ky., a car in a freight train was derailed and a man riding in it, taking care of horses, was killed. Two other horsemen were injured.

27th, on Chesapeake & Ohio, in Cincinnati, O., a car in a freight train was derailed on the high Ohio River bridge and came near falling into the street below. A brakeman was injured.

And 19 others on 16 roads, involving 4 passenger and 15 freight and other trains.

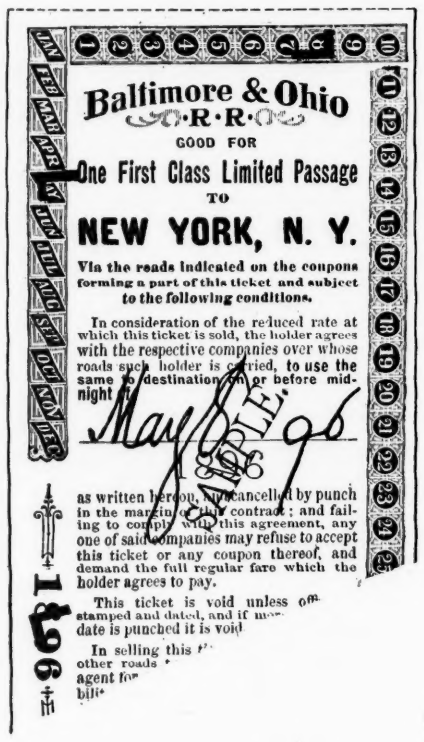
OTHER ACCIDENTS.

20th, 3 p. m., on Wheeling & Lake Erie, near Fremont, O., the caboose of a freight train was wrecked by a large tree which was blown over by a sudden tornado just as the train came along.

A summary will be found in another column.

Baltimore & Ohio "L" Punch.

The engraving given herewith shows a sample of a form of ticket recently put into use at a few stations on the Baltimore & Ohio for the purpose of more effectually guarding against fraudulent changing of time limits. In connection with this ticket a new and larger "L" punch is used, the size of which can be seen in the



sample, the reproduction being the same size as the original. With the ample space allowed for writing the date with indelible pencil or ink, and the large size of the cut made by the punch, any tampering with the ticket ought to be quite readily detected. General Passenger Agent Scull tells us that thus far this arrangement has given satisfaction.

Piece Work in Railroad Car Shops.

At the February meeting of the Western Railway Club Mr. G. L. Potter, Superintendent of Motive Power, Pennsylvania Lines, Southwest System, and President of the Western Railway Club, read a paper on "Piece Work in Car Shops." This paper was discussed at the March meeting, and we give below some extracts from the paper and the discussion. We would call particular attention to the admirable paper by Mr. F. W. Taylor, of the Midvale Steel Company, to which Mr. Potter refers, which will be found in the *Transactions* of the American Society of Mechanical Engineers. An abstract of this paper was published in the *Railroad Gazette* of July 5, 1895, page 442. The best account, by all odds, of the application of piece work in car shops that we have ever seen, was prepared for the *Railroad Gazette* by Mr. F. D. Casanave, and published by us in 1886, July 2 to Aug. 27. Those who have access to that volume of the *Railroad Gazette* should read those articles.

The manufacturing and repairing of the parts of locomotives under the piece work system had been practiced a number of years before the system was applied to car work, especially to the repairing of cars. This was due probably to the fact that the amount of money expended on locomotive work is so great per engine built or repaired, and the labor such a large percentage of the total cost; in new work being about 45 per cent., and in repair work from 65 to 70 per cent., while the cost of labor in building new cars is only from 12 to 15 per cent. of the total cost, and in repairs from 45 to 50 per cent. It is also due to the fact that, on account of the much longer time required to perform the different operations on locomotive than on car work, it is much easier to determine the prices that should be paid, and with much less danger of error.

This trouble in determining the prices to be paid is not so great in building new as in repairing old cars. In new work the amount of time that should be required is comparatively easy to determine. In repair work the conditions are different. Different cars will require different parts to be repaired, so that it is necessary to establish a price for removing and replacing and repairing each part. The difference in time required to remove the corresponding parts on different cars (even though they be of the same design), and the difference in the time required by different men to perform the same work, and the getting out of the parts in small numbers, are the main difficulties encountered in arriving at prices that are fair to both employer and employee.

The benefits of the piece work system accrue not only to the employer, but also to the employee. . . . There is probably more supervision required under the piece work than under the day work system, in the first place to see that only such parts that actually require it are repaired. There is a great tendency on the part of workmen to renew more parts than are actually necessary, especially if by doing so the earnings can be increased. To provide against this it is customary to have the car thoroughly examined before being taken into the shop, by a competent inspector, who notes on a blank the work to be done, and only such work as is so noted is allowed to be done without the permission of the foreman in charge. In the second place, the cars should be carefully inspected after completion, to see that all the work called for on the blank has been done and done in a proper manner, the inspector checking the items called for on the blank upon which the parts to be repaired have been entered against the parts repaired on the car. In the third place, there is danger of material being wasted by unscrupulous workmen, especially if parts can be removed more quickly and easily by destroying them. This is particularly the case in truck work, where it is easier to break the bolt off than to take off the nuts.

In starting the piece-work system in a railroad shop, the first impression that is usually formed in the minds of the workman is that it is a scheme to reduce wages. It is necessary, therefore, to successfully establish a system, to disabuse their minds of this idea and to have them feel that the benefits will be mutual. Failures to introduce the system successfully, where it has been undertaken, can, I think, be traced in the majority of cases to unfair dealings on the part of those in charge, by reducing the prices when it was found that by extra or unusual exertions the workmen were enabled to materially increase their earnings, thus discouraging them and causing them to look upon the scheme with suspicion.

When the piece-werk system has been established on a fair and equitable basis, it will be found that the cost of the output will be very much reduced, the workmen will be enabled to increase their earnings, and there will be much less dissatisfaction among them, and a great stride in the solution of the labor problem will have been made.

To illustrate how both the employer and employee are benefited under the piece work system, we will show the cost of repairing three important items on freight cars when performed under the day rate and under this system.

Removing and Replacing one Draft Rigging.—Under the day work system it required about six hours' labor at 19 cents per hour. The cost of the operation was $1.14. The piece-work price for this item is 90 cents. The work is performed in about four hours, thus increasing the earnings of the man from 19 to 22½ cents per hour, and resulting in a saving to the railroad company of 24 cents.

Removing and Replacing one Body Bolster required under the day-work system about 10 hours, at a cost of $1.90. Under the present system of piece work, the body bolster is removed and replaced for $1.05. This price includes the cost of removing and replacing one truck; namely, 25 cents. The work is performed in about 4½ hours; thus the man has increased his earnings from 19 to 23⅓ cents per hour and the cost of doing the work has been reduced 85 cents.

Removing and Replacing one End Sill formerly required about five hours' labor at a cost of 95 cents. For this operation 70 cents is now paid and the work is performed in three hours. The earnings of the man are increased from 19 to 23⅓ cents per hour and the saving to the railroad company is 25 cents.

When the cost of work by outside car shops is compared with that done by the average railroad shop it would at first seem discreditable to the shop management of the latter, but when the disadvantages which the ordinary railroad shop is working under are considered the cause of the apparent discrepancy will be readily appreciated. A large number of old employees with the high rates of pay paid skilled mechanics in the early history of railway work is a legacy which has been handed down to those now in charge of many railway shops which were established many years ago. When railroad companies first found it necessary to repair their own cars few of the facilities which are now in use were in existence; only the simpler and cruder forms of tools were known. This condition of affairs made necessary the employment of skilled mechanics on car work, while to-day such skill is unnecessary, as with the more modern tools and appliances the parts are produced ready to be put in place, which can be done by practically unskilled workmen. To give an instance: At one time it was supposed that the boring of wheels and the turning of axles could only be properly done by one who had thoroughly mastered the machinist trade. In many shops this class of men who have been doing this work for many years are still in the service, making it necessary to pay much higher prices for the work they perform than would be necessary if younger men and men suited for the work were employed. It was not uncommon a few years ago to find in many shops the price paid for turning the axle of a 60,000 capacity car from 35 to 45 cents each. To-day the same axles are being turned at a cost of from 15 to 20 cents each. A bright laborer, with good tools and proper instructions, can be taught to turn out axles well machined up to the full capacity of the machine in from three to six months, and at the prices for axles mentioned above can earn from $1.50 to $2.50 per day.

Mr. Fred W. Taylor, of the Midvale Steel Co., delivered a most excellent article, "A Piece Rate System," before the meeting of the American Society of Mechanical Engineers, held in Detroit in June, 1895, in which he has described the elementary system very fully, and we would suggest a very careful perusal of this paper by anyone interested in the subject. [For an abstract of this paper, see the *Railroad Gazette*, July 5, 1895.]

DISCUSSION.

Mr. E. M. HERR (C. & N. W.): I believe very firmly that the piece-work method of doing work is the correct one, the best one, not only in the interest of the employer, but for the employee. However, it is a matter that should not be entered upon without very careful consideration, and good judgment being used in the establishment of prices. If piece-work prices are established and erroneously established, they can be the means of just as much harm to the interests of both parties as they can of good if properly adjusted. I have known of cases where piece-work prices were established and maintained at a higher rate than the same work could be done for by the day, and have ample time for the men to do it in also. The proper method to pursue in establishing piece-work prices is first to carefully follow up the actual cost of doing the work in the shop by the day-work method; and I will venture to say that in most railroad repair shops the actual cost of doing details of work that are done every day, such as boring out eccentric straps, turning tires, axles, etc., are not really known by the men in charge.

This matter was very forcibly brought to my mind a short time ago by going through one of the shops on the road with which I am connected with a master mechanic from another road. He began asking me, what does it cost you to do this, that and the other thing. I replied, "I cannot tell you; I do not follow the details here close enough to know, but I will call the general foreman; he will be able to tell us." I called the general foreman and asked him the same questions. Says he, "I do not know myself, but I will ask the foreman of this department," and he called the foreman of the department and he gave the same answer, saying, "I will go up and find out how long it takes that fellow to do it." Now, that was a very valuable object lesson to me, and one that I think possibly others might profit by. I know it set me to work at once finding out why these men did not know the cost of doing this work. . . .

Mr. J. N. BARR (C., M. & St. P.): I am fully in accord with the piece-work system. I have seen it in operation on the Pennsylvania road; we have it in operation in only one department on the St. Paul road, and while I would like to put it in operation, I have always been afraid to undertake it on account of the large amount of labor involved in getting ready for it. There is no rational method for doing this work and rewarding men in accordance with their capacity otherwise; we pay two men the same rate of wages; one can do twice as much as the other; he could earn twice as much as the other and possibly not work any harder, but the practical results are that he does not. Now, if he has the skill and capacity to earn more, be certainly ought to profit. . . . I am satisfied that with a proper inauguration of the piece-work system we would be benefiting the men and benefiting ourselves, and doing for the men what really is the right thing.

MR. G. W. RHODES (C., B. & Q.): The term piece work does not necessarily mean paying so much for every item that is done at our shops. What gives interest to the general discussion on piece work is that it means that the men who are in charge of the shops know what their work costs. At some of our shops, when the matter has been discussed, we have at all times been willing to waive the question of piece work, providing those in charge of the shops know what their work is costing them. . . .

There is no reason why there should not be just as much competition or just as much knowledge as to what things cost in railroad companies' shops as there is in manufacturing shops, and if piece work is so desirable in manufacturing companies' shops, there is no reason why it should not be inaugurated in railroad companies' shops. But that alone will not settle the matter. If you have piece work and no competition it will not amount to anything. I can cite an example where, at the shops of a certain road, occurring the early part of this year, it was customary by the piece to bore out two 60-in. tires in 10 hours. In another shop, where day work was used, the shops produced on the same machines four tires a day. As soon as a little competition was brought up between these two shops there was a marked change. To-day the shop that was boring four tires by the day is still boring four, but the shop that was boring but two by the piece is now boring six, and where the tires at the commencement of the year were costing $1.65 each to bore, to day they are costing 50 cents each. Piece work is of very little use unless with it we have intelligent information as to what work ought to cost. The successful shop manager of the future will have to know much more about the cost of maintaining details of rolling stock than has been exacted in the past.

MR. W. W. ATTERBURY (Pennsylvania Lines): Mr. Rhodes has raised the matter of competition. This is a matter in which the piece-rate prices can be used to great advantage. The question frequently comes up as to the cost of doing a certain class of work at the shop; and also if it would not be advisable to stop doing such work and buy from a manufacturer who makes a specialty of that particular part. If such material can be purchased more cheaply than we can manufacture it, the attention of the foreman as well as of the the man who has been doing such work is called to this fact; they appreciate the necessity of keeping the work in the shop if possible, and everyone is interested in devising some scheme whereby the cost of manufacture can be reduced to a price which will enable us to compete with the specialists. In just such cases as this, the piece-rate system is of great aid.

Mr. W. H. HARRISON (B. & O. R. R.): We have been successfully working piece work for the last two or three years. We have not our figures completed by any means; we have to keep changing them all the time. We are doing everything we possibly can by piece work, and so far as our operations show now we conclude that we get about 16 per cent. more work, while the mechanic will make about 8 per cent. more pay, based on his average day's wages.

The English Railway Clearing House.

The Railway Clearing House, under which the railroads of Great Britain live and work, has been described by various writers, and especially well in Sir George Findlay's excellent little book "The Working and Management of an English Railway," but we do not remember to have seen anywhere a description at once so compact and so complete as that which we find in a paper lately read before the Commercial Club of St. Louis by Dr. William Tausig, Ex-President of the Terminal Railroad Association of St. Louis and President of the St. Louis Bridge Company. We shall reprint later other parts of this paper, but confine our extracts now to what he said about the clearing house.

One of the most admirable features of the English railway system, and one which, if it were adopted in this country, would be of inestimable value to our railroad properties, is the Railway Clearing House. This great institution, which commenced its operations in 1842 with one clerk and two assistants, and which in 1892, when it celebrated the fiftieth anniversary of its existence, conducted its operations with a staff of over 3,000 employees, and when I visited it a few months ago, had increased its staff to 4,000, is an organization as vast in its scope, as far-reaching in its influence, as stable and commanding in its rules and methods, and as judicial and impartial in its dealings, as a well-governed state, and yet through all the intricacy of its organization, as simple, as accurate and as unfailing in its performances, as though it were moved by a feather instead of by the ponderous machinery of its working department.

The Railway Clearing House is a corporation created by an act of Parliament, under which it is authorized "to settle and adjust the receipts arising from railway traffic within or partly within the United Kingdom, booked or invoiced at through rates or fares."

The act of Parliament under which it operates consists of twenty-eight sections and declares it to be a corporation authorized to sue and be sued, and declares every railway company which is a member at the time of the passage of the act, or subsequently joins it, as a member of the corporation. In the various sections provision is made how members (only railway companies being permitted to be members) may join or withdraw, how the corporation should organize, and what the methods of conducting its business and accounting should be, defines its powers and its forms of action in courts. Under sections 18 and 19 of the act, the records and minutes of the corporation are prima facie evidence in court, and anything declared by the Board to be due is considered to be legally due until otherwise proven by a contestant.

The salient features of the organization are:

First. It has nothing to do with the fixing of rates.

Second. It undertakes only the division and settlement of the revenue derived from freight and passengers which pass over more than one line.

Third. It has nothing to do with local traffic.

Fourth. Each line determines its own local rates. Where there is no agreement between connecting lines as to rates on joint traffic, the Clearing House collects the sum of the local rates. If disputes arise, it makes no distribution of amounts collected, but holds them until the parties agree among themselves, or agree to submit the dispute to the Arbitration Committee of the Clearing House. If so submitted, the decision is final.

Fifth. It pays out only balances found to be due to each road upon monthly settlements.

Sixth. It keeps control, through its own officers and employees, of all movements of all the rolling stock belonging to one company over the lines of another, notes their mileage and distributes the charges arising therefrom.

Seventh. It attends to the tracing and recovering of all lost packages in freight or passenger trains and to the settlement of these losses if not recovered, and determines the responsibility, or proportion thereof, of each line which has carried them.

Eighth. Besides collecting and distributing monthly revenues arising from the carrying of freight and passengers over connecting lines, it supervises and controls the General and Postal Parcel Department, which is similar to our express business. Settlements of revenues arising from the Parcel Department are made only every six months.

It will be seen from the above that the Railway Clearing House deals not merely with accounts, but with almost all questions that can arise between the different railway companies. The chief departments into which it is organized are the following: (1) The Department for Freight Traffic, (2) Department of Passenger Traffic, of which the Parcel Department is a branch, (3) Department for the Tracing of Cars of one line running over another line and for recording the mileage thereof, and (4) Department for Lost Articles.

First. The Department for Freight Traffic: The main work of this department is the monthly division of charges for the transportation of all classes of freight which pass over more than one railway. For the purpose of division the department receives from every station a report of the whole of the goods dispatched every day, and also of the goods received, and the first task of the department, when all these have come in, is to group them together, so that shipments and receipts may be easily compared with one another. If differences appear, they are sent to the respective stations, and no settlement is made until the difference is cleared up. The report of the two stations having been verified, the report of the sending station, which generally collects the entire amount, is transferred to what is called the "settlement form" and the total amount of freight divided between the railways concerned.

It has already been noted that the railway stations all provide their own terminals and the delivery of goods by rail or cartage, and it is one of the provinces of the Railway Clearing House to adjust and distribute these terminal or cartage charges equitably between the lines concerned. The terminal charges are deducted from the gross freight charges, and distributed among the parties who perform that service, whether that service consist in carting or in switching by rail.

The rates charged for terminal and cartage service are arbitrary and amount to 8s. 6d. ($2.12½ per ton, equivalent to 21 cents per hundred) in London, and 4s. ($1 per ton, 5 cents per hundred) in the country, when carted,

and 1s. 6d. (37c.) per ton, both in London and the country, when not carted.

In quite a large book containing the rules and regulations of the Clearing House, the special terminal charges upon a large number of articles (classified according to weight, value, perishableness, etc.,) cover a great many pages, and only a few characteristic examples can be cited. Where, for instance, a line connecting the terminus of one railroad with that of another, what we would call a belt line, does the switching, the rate paid is generally graded per ton per mile of road, but the distance allowed for switching service is generally two and three times the actual distance, and the minimum mileage charge 2s. and 2d. (29c.) per ton. The Metropolitan Company, for instance, which does the largest distributing business by rail over termini, is allowed two to three miles for every mile or fraction of a mile, with a minimum of six miles. The same method applies to bridge tolls (called pontages) and tunnel tolls. The North British Company, for instance, is allowed, in the division of receipts from all traffic passing over the Forth Bridge, a mileage proportion for nineteen miles in addition to the actual mileage of the bridge and its railway. The Great Western Company is allowed, in the division of receipts of all traffic passing through the Severn Tunnel, the mileage proportion of twelve miles in addition to its actual distance, etc.

Compared with the average terminal charges in this country the above seem enormous.

Such a thing as an absolute terminal charge (2s. 6d.) per ton attaching to all goods delivered, whether handled or not, does not exist in this country. The St. Louis Bridge charges 3¢c. (2s. 2½d.) per ton for its toll over the bridge and through the tunnel, inclusive of the service of hauling the freight with its own motive power and delivery to consignees at its yards and warehouses. If it were to charge the same toll (pontage) as the Forth Bridge and Severn Tunnel get, this would, the bridge being one and two-thirds miles and the tunnel one mile long, at the rate of 2s. 6d. per ton per mile, and adding nineteen miles to the first and ten miles to the second, amount to $11.12 per ton over the first, and about half of that for the second, say, $16 per ton, against 30c.

In New York the lighterage is two cents per 100, or 40 cents per ton, against the arbitrary charge of 29 cents in London without any service. In Chicago, where the published switching schedule charge varies from $1.50 to $10 per car, with an average of $3.44, the charge appears to be nominal when compared with those exacted in London for similar service. In St. Louis recently, a proposed belt line of great importance, could not obtain a charter from the city because it would not agree to switch cars to any distance for a maximum of $1.50 per car. Its proposition to make the maximum $2 was rejected.

Recurring now to the general settlements. When all items of charge are finally combined together a monthly statement is prepared for each railway company. The statements show in detail the traffic between each pair of stations, the route taken by the goods, their classification, the amount received and expended on them at each station, the amount and mode of distribution of the terminal charges, the amounts due to intermediate companies, and finally, the mileage of transportation over the lines of each company. These monthly statements also show what every freight clerk at each station owes to his company, and the result is that any station can send goods to any other station without the companies concerned paying the smallest attention to the charges involved, this business being wholly undertaken by the Clearing House. At the same time the respective railway companies have themselves full control of the Clearing House, and the results and totals are presented to them in a form which permits of the easiest possible verification. A freight train, as often happens, may be composed of cars belonging to one or more lines, carrying goods from many different stations on other lines, and drawn by an engine of an entirely different line, but the machinery of the Clearing House is such that the proportion of charges thereby accruing to each railway concerned will be ascertained and set forth with an accuracy that makes even a trivial error at once difficult of occurrence and easy of correction.

(TO BE CONTINUED.)

TECHNICAL.

Manufacturing and Business.

At a meeting of the stockholders of the Boyden Brake Co., held at Baltimore last week the following were elected directors: George A. Boyden, Douglas H. Thomas, William Whitridge, Charles B. Mann, Theodore G. Lurman, Bernard N. Baker, Skipwith Wilmer and Romulus M. Griffith.

The annual meeting of the stockholders of the National Switch and Signal Co. was held at its offices Easton, Pa., May 12, at which time the present directors and officers were re-elected for the ensuing year.

F. M. Pease, dealer in railroad supplies at 355 Dearborn street, Chicago, offers for sale 4,650 tons of old steel rails, weighing from 52-lbs. to the yard to 62-lbs. These rails include 2,000 tons of 62-lb. rail on the Chesapeake & Ohio offered for sale at $21.75 per gross ton; 1,000 tons of 65-lb. rail, 1,000 tons of 60-lb. rail, and 300 tons of 56-lb. rail on the Chicago & Grand Trunk held at $21 a ton, 352 tons of 52-lb. rail on the Toledo & Ohio Central held at $19 per gross ton; these rails will be delivered f. o. b. at any point on the road where they are stored.

The Railway Cycle Manufacturing Co., of Hagerstown, Ind., has recently received an order from Moscow, Russia, for eight inspection cars to be shipped at once. The company reports a very satisfactory business with a growing demand for its light inspection cars.

The Jerome metallic packing has been specified on 30 locomotives building for the New York, New Haven & Hartford road at the Schenectady Locomotive Works. Mr. C. C. Jerome, the manufacturer, also reports that this packing is being used on a number of compound locomotives building for the Union Pacific at the Baldwin Works and a number of small orders from other locomotive builders have also been received recently. Mr. Jerome also reports sales of a large number of McIntosh blow-off cocks.

The Little Giant Buckeye coupler, made by the Buckeye Malleable Iron and Coupler Co., of Columbus, O., was specified on the 5,000 freight cars recently ordered by the Baltimore & Ohio. C. H. McKibbin & Co., of 120 Broadway, New York, have been appointed General Sales Agents of the coupler company. They have been previously General Agents.

Mr. Mark A. Ross, for some time past with the National Tube Works Co., of St. Louis, will be associated after June 1 with Mr. Royal C. Vilas, of Chicago, who has recently taken up the sale of the National electric headlight.

The final discharge of Charles A. Sterling, Receiver of the Cofrode & Saylor Co., was ordered last week by Vice-Chancellor Stevens. The company went into the hands of the Receiver three years ago. All the debts have been paid, and there is a balance of $3,000.

The works of the Premier Steel Co., which have been in the hands of a Receiver since May, 1893, lying idle, are said to have been leased to a syndicate composed of the American Tin Plate Works, of Elwood, and the American Wire Nail Co., of Anderson, Ga. The new company will begin the manufacture of steel billets, steel beams and structural iron.

A company has been organized by business men of Pittsburgh, Pa., Wooster and Columbus, O., with a capital of $500,000, to manufacture weldless tubing. It is said that the company will build its shops, which it is expected will be completed Sept. 1, at Newark, O.

The National Switch and Signal Co., of Easton, Pa., has been awarded the contract for installing two complete signal plants for the Troy Union Railroad at the main passenger station at Troy, N. Y. There will be a signal tower erected on a steel bridge spanning the tracks at each entrance to the station, which is a through station, and all tracks within the train shed will be connected to multiple indicators in the towers. All the latest improvements in the art will be adopted.

The Standard Car Wheel Co., of Cleveland, was incorporated in Ohio last week with a capital stock of $75,000, the incorporators being N. P. Bowler, C. A. Brayton, W. L. Bowler, W. B. Brayton and Francis J. Wing.

The Chicago Pneumatic Tool Co. reports further large foreign orders for its tools, and is now shipping 300 of its largest size machines to Europe. The company is now making the Manning sandpapering machine, which has proved economical on coach work; a pneumatic car cleaner for cleaning seats, upholstery and carpets, the dust being carried through the hose out of the windows of the cars, and the Manning piston air-drill, a new machine just being put on the market. Mr. T. F. DeGarmo has recently been appointed Eastern representative of the company, with office in New York City, and Mr. William Mack, Western representative, with office at Denver, Col. A London office will be opened shortly.

The large additions to the factories of the Garlock Packing Co., of Palmyra, N. Y., are now nearly completed. The present buildings at Palmyra, N. Y., and Rome, Ga., have been very busy for some time past and are still crowded with orders. The company is now making its waterproof hydraulic and high-pressure piston packings in both ring and spiral forms, and the company reports a constantly increasing trade for both of these packings.

The Standard couplers are to be used on the 1,000 new cars of the Lehigh Valley road.

Iron and Steel.

The blast furnace and other property of the Vanderbilt Iron & Steel Co., of Birmingham, Ala., were sold at auction last week to John H. Blackwell and Wm. H. Gaudy for $10,000.

New Stations and Shops.

The officers of the St. Louis Southwestern are reported to have definitely decided upon the erection of the proposed general shops of the Texas lines of the company at Tyler, Tex. The citizens of Tyler have agreed to give the company a subsidy of $15,000 in cash for the shops and the site for the buildings is reported to have been purchased last week by the railroad company.

Interlocking and Block Signaling.

The Standard Railway Signal Company, of Rahway, N. J., the new company which has been started by Henry Johnson and John T. Cade, has received an order from the Central of New Jersey to erect two interlocking plants for that road at Jersey City. One of the machines will have 84 levers and the other 56. The Standard Railway Signal Company now has an office in New York City; it is in the Havemeyer Building, 26 Cortlandt street.

The Philadelphia & Reading, which not long ago ordered Hall automatic signals for the Atlantic City Railroad, 55 miles long, has lately given an order for additional signals on the New York and the North Penn divisions. On the New York division signals will be put in from Jenkintown to Bethayres, about 4 miles, and on the other line to Fort Washington, about 5 miles.

Rails for the Grand Trunk.

The Grand Trunk Railway has adopted for renewals an 80-lb. rail of the section recommended by the American Society of Civil Engineers. As this section is very familiar to those of our readers who are interested in this matter we do not reproduce it. It is 5 in. wide on the base, 5 in. high, with the head 2⅝ in. broad, sides of head vertical, upper corner radius $\frac{5}{16}$ in. With this rail a four-bolt joint is used 2 ft. long. The specifications under which the rails will be made are essentially those of the East Indian Railways. Those specifications were given in our issue of Nov. 8, 1895, page 733. They call for carbon not less than .3, or more than .45; silicon .06; phosphorus and arsenic together not more than .6; sulphur not more than .06. The Indian specifications also call for drop tests. The Grand Trunk rails are being made in Chicago. We do not know that the chemical specification is precisely that which we have given above.

Spring-Supported Anvil for Drop Testing.

The drop-test apparatus at Altoona, Pa., has been rearranged in that the anvil has been put on springs. This anvil weighs 17,500 lbs. and it is supported by 12 double-coil springs. The springs are 9½ in. high when open and 5½ when closed; when compressed to 7 in. they will carry 80,000 lbs. The reason for putting the anvil on springs is that drop tests made at all times, whether the ground is frozen or not, may be strictly comparable. The anvil thus becomes independent of surrounding objects so far as the purposes of the drop test go.

Electric Power from Niagara Falls to New York City.

Since the opening of the Electrical Exposition at the Grand Central Palace, in New York, the first day of May, daily and weekly papers have frequently referred to the subject of the transmission of electric energy from Niagara Falls for the purpose of running machinery at the Exposition. Inasmuch as most of these reports are misleading, and some entirely untrue, it may be well to state the facts in the case. Current, which is generated at Niagara and transmitted over an ordinary telegraph wire, is used at the exhibition for running a small model of the Niagara Power Plant in the evening and occasionally charging small storage batteries in the daytime, and that is all for which it is used. The machinery at the exhibit is not run by power from the Falls, nor is the Niagara current used in any other part of New York City. The economical transmission of a large quantity of electricity for a great distance is still an unsolved problem.

Heating the B. & O. Station, Baltimore.

We stated in our article of last week, describing the new Mt. Royal Station of the B. & O. in Baltimore, that the station would be heated by electricity. This was the original intention, but it is now thought that the expense would be too great, and it is probable that steam will be substituted.

Torpedoes on the London & Northwestern.

The London & North Western has lately adopted a new type of detonator or torpedo, known as the "Duplex" and has changed the fog-signaling rule throughout its lines so as to require the use hereafter of only one torpedo as a danger signal, instead of two (placed 10 yds. apart) as heretofore.

Cast-Iron Wheels in Europe.

Of all the countries of Continental Europe Austria is the only one where the use of cast-iron wheels for railroad purposes is not now prohibited by law. The Austrian Government, during the past year, asked its representative in the United States, Mr. Fr. von Emperger, Consulting Engineer, 71 Broadway, New York, to make an investigation of American practice. As a result of this investigation the Austrian Government Railroads placed an order with the New York Car Wheel Works, Buffalo, N. Y., for 120 car wheels (system P. H. Griffin) of the standard size for the express purpose of using them on freight cars with brakes. The lot has been delivered, but cannot be used elsewhere than within the Austrian boundaries. The reason of this limitation is a rule of the German Railroad Union, which prohibits the use of brakes with cast-iron wheels, and the interchange of cast-iron wheels is therefore impossible, except within the Austrian boundaries, where the railroad system comprises some 6,000 miles. If by these trials and from knowledge of American practice the European officials can be induced to abolish the above-mentioned rule of the German Railroad Union there would be a prospect for the export of cast-iron wheels to Europe, as the necessary experience and skilled labor, as well as the requisite machinery, cannot be had anywhere in Europe. This trade would, of course, be limited to Austria for the present, so far as railroads are concerned, and to street railroad equipment. Mr. von Emperger has gone to Vienna to take charge of his continental office there and expects to give this matter considerable attention.

Baldwin Compounds.

The Baldwin Locomotive Works had, up to the first of May, built a total of 688 locomotives compounded on the Vauclain system, and the fact which is most encouraging for the future of that engine, is that they receive many orders for duplicates from people who have used the engine, also for cylinders to change from simple to compound on roads that have made a trial of the compound. We are informed that the Chicago, Milwaukee & St. Paul people are likely to make the compound the prevalent type in future, using the simple only for certain special service.

Coupler Tests.

The Wilmington Malleable Iron Co. writes to us as follows: "In the last issue of the *Railroad Gazette* we saw an article [page 328] on the test of M. C. B. couplers which interested us very much. First, on account of the railroad's requirements under a drop test, and secondly, the test that the couplers stood which were made by the Steel Company as being much beyond the requirements of couplers in actual service, and we would be glad if you would give us the weights of couplers tested.

We have erected a drop with solid foundation with a drop weight of 1,640 lbs., and after considering what these couplers are required to stand and what those stood in the test, we dropped some of our own make, the 'Little Delaware,' and herein give you a record of the tests:

	5 ft.	10 ft.	45 ft.	Total
Test No. 1 bar stood	6 blows	6 blows	5 blows	180 ft.
	5 ft.	10 ft.	15 ft.	
Test No. 2 bar stood.....	3 blows	3 blows	6 blows	
	3 ft.	5 ft.	6 ft.	10 ft.	Total
Same bar, guard arm test.....	3 blows	2 blows	2 blows	2 blows	186 ft.

"This we consider fairly good, as the whole equipment (made entirely by our company) weighs only 180 lbs; yet it does not equal the steel test, and for that reason we would like to learn the weight of couplers tested by them." The Shickle, Harrison & Howard coupler, of which tests were reported by us May 1, page 328, weighed 224½ lbs., complete. The drawhead weighed 153 lbs., the knuckle weighed 53¾ lbs., the knuckle pin 6 lbs., the lifting pin 3 lbs. and the lashing block 9 lbs. The material throughout was open hearth steel.

THE SCRAP HEAP.

Notes.

A fire at Eddy's Lick, Pa., last week, destroyed 150 loaded freight cars.

The General Passenger Agent of the Baltimore & Ohio states that during the month of April the through express trains of that road completed 95 per cent. of their trips on time.

Three hundred feet of the Yates coal chutes at Charlotte, N. Y., with 30 loaded coal cars, were broken down by a collision of cars and fell into the river one day last week, causing a loss of $18,000.

The Cincinnati, Hamilton & Dayton and the Louisville, New Albany & Chicago have put on a fast mail train between Cincinnati and Chicago. The trains leave each city at about 3 a. m., and run through in nine hours. The daily newspapers out West seem to have a strong "pull" with the Post Office Department.

The bill authorizing the construction of the proposed new Union Passenger Station at Boston has been revised by a committee of the Massachusetts Legislature and is now said to have a good chance of being passed. The bill limits the amount of bonds which the city may issue in connection with the improvements to $2,000,000. The legislature has also been modifying the law under which the Boston underground railroad is being built, or rather has tried to. A bill has been passed by one House forbidding the Transit Commissioners to lease the subway for a longer term than 10 years.

The use of gates on the passenger cars of the Southern Pacific during the past two months has proved so satisfactory that the plan has been put in operation on additional trains. There are now gate keepers on the day trains of the Galveston, Harrisburg & San Antonio between Houston and San Anionio, on the New York, Texas & Mexican between Houston and Cuero, on the Sabine division of the Texas & New Orleans between Beaumont and Rockland, and on the Alexandria branch of Morgan's Texas & Louisiana line between Alexandria and Lafayette. All passengers are required to exhibit their ticket before entering the cars. Drummers are supposed to be greatly disgruntled by such regulations as this; but one of them, interviewed by a Texas paper, says: "It's a first-rate system. It's a little inconvenient to set down your grips while your ticket is being punched, but you know when you leave the car at the eating station that there is not going to be a gang of tramps chasing through the car from one end to the other, that the ice-water is not going to be consumed by non-travelers, and that articles lying around loose are safe from the outside public, at least. Put me down as one drummer who has no kick against the gate system. I would like to see it in effect on all the roads."

Contracts for Armor.

Secretary Herbert has accepted the bids of the Carnegie Steel Co. and the Bethlehem Iron Co. for supplying armor for the Kearsarge and the Kentucky. The total amount required is 5,660 tons, of which the Carnegie Co. will furnish 3,007 tons and the Bethlehem Co. 2,653 tons. The total cost will be $3,124,710 or about $552 07 per ton, which is said to be between $50 and $60 less than the cost of former contracts.

Russian Armor Tested.

An 8-in. Harveyized plate, representing 600 tons of armor made by the Bethlehem Iron Co. for the Russian Government, was tested last week at the Indian Head Proving Grounds. Nine shots were fired, six 6-in. and three 4 in. Holtzer shells being used, all of which were smashed in the plate after penetrating a few inches. The result of the test was satisfactory, and the armor was accepted.

The M. C. B. Convention.

Col. H. S. Haines has promised to make the opening address at the Convention of the Master Car Builders' Association.

The Transportation Club (New York).

The annual meeting of the Transportation Club was held in New York Saturday morning, May 16, with 30 members present. Mr Nathan Guilford was chosen Chairman of the meeting and Mr. John Carstensen Secretary. The minutes of the members' meeting of June 27, 1895, were read and upon motion approved.

The Chairman announced the following named gentlemen as the Nominating Committee for the present meeting: Messrs. James Foster, Marshal L. Bacon, Walter B. Pollock, Edward J. Richards and John F. Fairlamb, also for Inspectors of Election for the present meeting, Messrs. Dwight W. Pardee, Edgar Freeman, Daniel A. Waterman.

The Nominating Committee having submitted the following list of Managers for the terms of one, two and three years, as provided by the constitution, the gentlemen named were unanimously elected by ballot, lots being drawn for their respective terms:

For three years: Messrs. Chauncey M. Depew, Edward V. W. Rossiter, Charles F. Cox, Nathan Guilford, Percy R. Todd.

For two years: Messrs. H. Walter Webb, James D. Layng, William L. Kingman, Thomas L. James, Frederick W. Schoonmaker.

For one year: Messrs. Edgar Van Etten, George H. Daniels, John Carstensen, Alfred Skitt, Ira A. Place.

The Nominating Committee submitted the names of the following gentlemen for the Nominating Committee for the ensuing year: Messrs. Horace J. Hayden, Chairman; William S. Hawk, Frederick C. Wagner, James Foster, Algernon S. Frissell, also the following named gentlemen for Inspectors of Election for the ensuing year: Messrs. Samuel Goodman, William T. Cornell, Daniel B. McCoy, all of whom were voted upon by ballot by the members present and unanimously elected.

The annual report of the Board of Managers was then read by the First Vice-President, Mr. Edward V. W. Rossiter. Some extracts follow:

Since the incorporation of the Transportation Club the treasury has received from members for entrance fees $9,720 and the balance on hand is $9,189.29. To this should be added the amount of entrance fees due but not yet paid, viz., $1,490, making an available total of $10,679.29. The Board of Managers has felt warranted in arranging for the furnishing and decorating of the club's rooms on the fourteenth floor of the Hotel Manhattan. After the consideration of several bids, that of Messrs. D. S. Hess & Company has been accepted as best meeting the requirements of the club and will involve the outlay of less than $12,000. As soon as the rooms are ready for occupancy the dues of the members will become payable. From this source, as soon as the membership limit is reached (300 resident, 200 non-resident), there will be derived an income of $24 000 per annum, which will be available for current expenses. The largest item of expense to the club will be the rental of its rooms, involving a payment of $12,000 for the first year and $15,000 for each of the nine years following. The present membership of the club is 284, of whom 132 are resident and 152 non-resident. Of these 110 resident and 139 non-resident have qualified by paying their entrance fees, leaving 22 resident and 13 non-resident in arrears. The Committee on Admissions has the names of 40 gentlemen proposed for membership, who, if elected at the next meeting, will bring the total membership at the close of May to 324.

A Commercial Tour to South America.

The National Association of Manufacturers is organizing a business men's tour to South America to cover the months of July, August and September. The party will sail from New York for Southampton July 1, and will sail from Southampton for the River Plate. They will touch at Vigo, at Lisbon, at the Canary Islands and at the Cape Verde Islands. Then they will stop an hour at Pernambuco, and will make short stops at Bahia and at Rio de Janeiro. At the latter port they will not land, however, on the outer voyage, but will go direct to Buenos Ayres. They will stay 10 days in the Argentine Republic, where opportunities will be given to them to see a great deal of the country and of its resources and industries. After this visit they will go to Montevideo, where a few days will be spent. Then they will proceed to Rio de Janeiro, whence visits will be made to places of interest and importance in Brazil.

The Production of Coal in the United States in 1895.

E. W. Parker, Statistician of the United States Geological Survey, has completed the compilation of the statistics of coal production in the United States during the calendar year 1895. The total output from all mines was 171,804,742 long tons, or 192,421,311 short tons, having a total value at the mines of $197,572,477. The output of anthracite coal in Pennsylvania increased from 46,358,144 long tons in 1894, to 51,785,122 long tons in 1895, a gain of over 5,460,000 tons. The product of bituminous coal increased from 118,820,405 short tons, in 1894, to 134,421,974 short tons in 1895. There was an increased production in all but five of the 29 coal-producing States. The States in which a decreased product was shown were Georgia, Kansas, North Dakota, West Virginia and Wyoming. The principal loser was Kansas. The product among the other leading coal States was: Illinois, 17,735,864, value $14,239,157; Ohio, 13,376,137, value, $10,637 553, and West Virginia, 11,424,863, value, $7,787,120.

Supreme Court Decisions.

The Supreme Court of the United States has sustained the constitutionality of the Louisiana law requiring separate cars for white and colored passengers. In this case the road, the East Louisiana, did no interstate business whatever. Justice Harlan delivered a dissenting opinion, holding that no power in the land has the right to thus regulate the enjoyment of civil rights.

The state of Illinois has lost its suit which was begun to compel the Illinois Central to run its through Chicago-New Orleans fast mail train into the city of Cairo. The Cairo city station is at the end of a branch about three miles long, and six through passenger trains daily are run to and from the city over this branch. The suit was based on the state law requiring all passenger trains to stop at every county seat. The Supreme Court of the United States holds the law, as affecting this train, unconstitutional, thus reversing the judgment of the state Supreme Court.

Religious Rates.

The South Carolina Railroad Commission has drawn distinction between circus tents and gospel tents. Heretofore both have been shipped at the same rate, but in response to an appeal from the owners of a gospel tabernacle tent, who asked for a better rate, the commission has placed the latter under another class, whereby they will hereafter be handled at a reduction of 33⅓ per cent. from that fixed for the irreverent circus tent.

Railroad Concession in Corea.

The United States Minister to Corea has informed the State Department at Washington that a concession to build a railroad between Seoul, the capital of Corea, and Chemulpo, its seaport, has been granted James R. Morse, for an American syndicate.

LOCOMOTIVE BUILDING.

The Lehigh Valley has ordered 25 freight and five passenger engines from the Baldwin Locomotive Works.

The Southern Railway has placed orders for 10 freight engines, six with the Brooks Locomotive Works and four with the Pittsburgh Locomotive Works.

CAR BUILDING.

The Texas & Pacific has ordered 300 freight cars from the Mount Vernon Car Manufacturing Co.

BRIDGE BUILDING.

Bridges Destroyed by Storms.—A number of bridges are reported as being destroyed last week by wind and rainstorms in the West. In Wisconsin two railroad bridges and two highway bridges are among those reported as swept away, while a number of washouts occurred on the Wisconsin Central. In Missouri the tracks of the Blair Line Railroad and those of the Quincy, Omaha & Kansas City were under water, causing traffic to be stopped. Several bridges near Milan, Mo., on the latter road are reported as carried away. At Sherman, Texas, an iron bridge was destroyed by a wind storm.

Allegheny, Pa.—Bids were received and opened May 15 by the County Engineer for building seven county bridges of through plate girder type and spans of from 30 to 60 ft. The contracts for six of these were awarded to the Pittsburgh Bridge Co. as the lowest bidder in each case. One of the bridges is a joint county bridge and the contract for that has not been placed.

Atlanta, Ga.—The bids for building a bridge 180 ft. long over Peachtree Creek are given as follows: Schultz Bridge & Iron Co., Pittsburgh, Pa., $6,857; Wisconsin Bridge & Iron Co., North Milwaukee, Wis., $6,464; Youngstown Bridge Co., $6,712; Toledo Bridge Co., $7,300; Bruce Erecting Co., Pittsburgh, $10,850; Louisville Bridge & Iron Co., $6,397; Virginia Bridge & Iron Co., Roanoke, Va., $6,749; Edge Moor Bridge Works, Wilmington, Del., $7,348; Jasper Construction Co., Jasper, Ala., $22,400. The contract was awarded to the Louisville Bridge & Iron Co.

Bedford, Pa.—Bids will be received until May 26 for a bridge in West Providence Township, one near Chaneyville and one near Sulphur Springs station. John T. Shaffer is County Clerk.

Bellaire, O.—The Bellaire & Benwood Bridge Co., which proposes to build a highway bridge over the Ohio River between Bellaire and Benwood, W. Va., has completed its plans and sent them to Washington for the approval of the Secretary of War.

Belmont, N. D.—The Minnesota Central & North Dakota Railroad Co. is reported as about to build a bridge over Red River. Elias Steenerson, Crookston, Minn., is President of the company.

Carlisle, Pa.—A petition for a new county bridge over the Yellow Breeches on the road from Mt. Holly to Boiling Springs has been submitted to the grand jury.

Confluence, Pa.—The Commissioners of Fayette and Somerset counties are having plans and specifications prepared for a bridge across the Youghiogheny River. There will be two spans of 136 ft. each, and a 16-ft. roadway.

Deep Water, W. Va.—An iron and steel bridge is to be built at the Kanawha River at this place by the Glenjean, Lower Soap Creek & Deep Water Railroad Co.

Denver, Col.—Plans are being prepared for a bridge 140 ft. long and 50 ft. wide at Lawrence street to cost about $10,500.

Duluth, Minn.—Bids were received as follows for a highway bridge over the tracks of the St. P. & D. and the D. & W. Railroad, at Short Line Port, St. Louis County, for an iron bridge: Chicago Bridge and Iron Co., $2,936; Toledo Bridge and Iron Co., $2,250; C. M. Horton, Duluth, Minn., $2,452.50; Wisconsin Bridge and Iron Co., Milwaukee, $2,115; Wrought Iron Bridge Co., Canton, O., $2,197; for a wooden bridge, John Gulbrauson, Duluth, $1,277; A. & D. Sang, Duluth, $1,171.50; William Cavanagh, Duluth, $1,554.25; George R. King, Duluth, $1,465.

Fairmont, W. Va.—A bridge 16 ft. wide, 250 ft. long and 50 ft. high is to be built between Fairmont and West Fairmont. The plans have been drawn by Perry Thompson, C. E., of Fairmont.

Knoxville, Tenn.—The contract for the bridge to be built over the Tennessee River at Gay street has been awarded to the Youngstown Bridge Co. for $210,600.

Manchester, N. H.—The contract has been awarded to the Groton Bridge and Manufacturing Co for building a bridge across the Merrimac River for $97,100.

Minneapolis, Minn.—Bids will be received till May 29 for building the Seventh street bridge over the tracks of the M. & St. L., and the Great Northern Railroad. Charles F. Haney is City Clerk.

Montreal, Que.—The Dominion Bridge Co. has been awarded the contract for building five bridges over the Saulanges Canal and two over the Cornwall Canal.

Morgantown, W. Va.—The Morgantown Bridge Co. will receive bids during June for reconstructing the roadway with iron floor beams and girders. The contract for repairing the cables of the bridge has been let to Roebling Sons. George C. Sturgis, Treasurer, can give further information.

Morristown, Pa.—The County Commissioners have decided to have five bridges built at an aggregate cost said to be $100,000. One of these will be at Morristown, one at Lower Salford, one in Towamencin Township and one in Worcester. The contracts will probably be let June 17.

Newcastle, Ont.—The Grand Trunk Railroad will build a steel bridge at Newcastle.

New York.—Governor Morton has signed the bill increasing from $75,000 to $250,000 the amount to be expended in constructing a new bridge connecting Pelham Bay with City Park in Westchester County.

Mayor Strong has vetoed the bill giving a private corporation the right to build a bridge across the East River from Long Island to New York over Ward's Island.

Niagara Falls, N. Y.—The contract for the steel arch bridge to replace the suspension bridge over the gorge below Niagara Falls has been awarded by Mr. L. L. Buck, chief engineer, to the Pennsylvania Steel Co., of Steelton, Pa. The bridge will have a main arch of 550 ft. and two side truss spans of 115 ft. each. There will be 218,000 lbs. of steel castings, 5,560,000 lbs. of steel plates and angles, 182,143 lbs. of steel eye bars and pins

and 30,000 lbs. of wrought iron rods and turnbuckles. The bridge is to be completed in one year and will cost about $500,000. A full description of this bridge was given in our issue of April 24.

Pittsburgh, Pa.—The Keystone Bridge Department of the Carnegie Steel Co. has been awarded the contract for furnishing the material for the bridge across the Monongahela from Homestead to Rankin.

Plainfield, N. J.—The bridge over the tracks of the Central of New Jersey was burned last Sunday, delaying traffic on the railroad for about three hours. It is said the bridge caught fire from a locomotive spark. The loss is about $5,000.

Providence, R. I.—At the last meeting of the Council a petition was submitted for a viaduct from the business part of the city to the high land on the East Side. The road between the places has a grade of 14 per cent., and by building a viaduct this could be reduced to 6 per cent.

Raleigh, N. C.—The Southern Railway Co. has been notified to build a stronger bridge over its tracks at South street, and it will probably be built within the course of a month.

Scranton, Pa.—An ordinance has been introduced in the Select Council providing for a viaduct on North Main avenue over Tripp's crossing. City Engineer Phillips has estimated the cost at $40,000.

Sutterville, Pa.—It is reported that the King Bridge Co. has been awarded the contract for the superstructure of the bridge across the Youghiogheny River, and Simon Harold, of Beaver Falls, the contract for the substructure.

Trenton, N. J.—Bids will be received until May 28 for building a bridge over Pond Run at Johnson avenue. Miller H. Cross is Chairman of the Board of Freeholders.

Upper Burlington, N. S.—A new bridge is to be built here this summer.

Yankton, S. Dak.—Engineeer Waldow, who has been making soundings for the piers for a railroad bridge across the Missouri River, has completed his work.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Catawissa, 3½ per cent. on preferred stock, payable May 20.

Delaware & Bound Brook, quarterly, 2 per cent., payable May 20.

North Pennsylvania, quarterly, 2 per cent., payable May 25.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Burlington, Cedar Rapids & Northern, annual, Cedar Rapids, Ia., May 26.

Butte, Anaconda & Pacific, annual, Anaconda, Mont., June 2.

Calgary & Edmonton, special, Windsor Hotel, Montreal, Que., June 10.

Canada Southern, annual, St. Thomas, Ont., June 5.

Chateaugay, annual, Plattsburgh, N. Y., May 30.

Chicago & Eastern Illinois, annual, company's office, Chicago, June 3.

Chicago & North Western, annual, company's office, Chicago, June 4.

Chicago & Western Indiana, annual, company's office, Chicago, June 2.

Chicago, Rock Island & Pacific, annual, company's office, Chicago, June 3.

Chicago, St Paul, Minneapolis & Omaha, annual, company's office, Hudson, Wis., June 6.

Des Moines & Fort Dodge, annual, company's office, Des Moines, Ia., June 4.

Duluth, South Shore & Atlantic, annual, company's office, Marquette, Mich., June 4.

Kanawha & Michigan, annual, Corning, O., June 2.

Keokuk & Des Moines, annual, company's office, Des Moines, Ia., June 3.

Manchester & Lawrence, annual, Amoskeag National Bank, Manchester, N. H., May 29.

Michigan Midland & Canada, annual, Michigan Central office, Detroit, Mich., June 4.

Northern, annual, Phœnix Hall, Concord, N. H., May 28.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Roadmasters' Association of America* will hold its next annual meeting at the Cataract Hotel, Niagara Falls, N. Y., beginning Sept. 8.

The *American Society of Civil Engineers* will hold its annual convention at San Francisco, beginning on or about June 30.

The *American Society of Mechanical Engineers* will hold its annual convention at the Southern Hotel, St. Louis, May 19 to 22. The programme of the meeting was published in the *Railroad Gazette* of April 24.

The *Traveling Engineers' Association* will hold its next annual meeting at Minneapolis, Minn., commencing Sept. 8

The *Master Car Builders' Association* will hold its next convention at Congress Hall, Saratoga Springs, N. Y., beginning June 17. The rates at Congress Hall are $3 a day for single rooms.

The *Master Mechanics' Association* will hold its next annual convention at Congress Hall, Saratoga Springs, beginning June 22.

The *Roadmasters' Association of America* will hold its next annual convention at Niagara Falls, beginning on Sept. 8.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago. Mr. George M. Basford, is secretary, The Rookery, Chicago.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. S. T. Johnston, Monadnock Block, Chicago, is secretary of the association.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' and Architects' Association of Southern California* meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June July, August and September.

The *Engineers' Society of Western New York* meets on the first Monday of each month at the Society's rooms in the Buffalo Library.

The Roadmasters' Association of America.

The association will hold its next annual convention at Niagara Falls, N. Y., beginning Sept. 8. The Cataract Hotel will be the headquarters of the association.

American Ticket Brokers' Association.

This association held its annual meeting at Buffalo, May 16. The officers chosen for the ensuing year are: President, Isaac Frank, New York; Secretary, W. D. Carter, Louisville.

St. Louis Railway Club.

This club was organized April 10, and is similar in character to other associations of its kind elsewhere. In our issue of April 10 we gave a list of the temporary officers, which has since been changed in one particular—Mr. W. C. Howland, 511 Commercial Building, St. Louis, now being secretary instead of Mr. W. A. Hobbs. On May 8 Mr. Ingalls made an address before the club on the development and workings of the Joint Traffic Association. The club's membership is now about 500.

Railroad Commissioners' Convention.

The eighth annual convention of State Railroad Commissioners, with the Interstate Commerce Commission, met in Washington May 19, with Simeon R. Billings, of Michigan, Chairman. Papers were read by President A. B. Stickney, of the Chicago Great Western, on "Railway Corporations and the Limitations to the State's Control of Rates," and by W. P. Clough on "The Influence of the Interstate Law on Decreasing Railway Revenues."

The Civil Engineers' Club of Cleveland.

At the meeting of the Civil Engineers' Club, held May 12, Mr. E. A. Sperry read a paper on "Steam Engines for Direct-connected Electric Generators," describing his invention by means of which the generator makes two revolutions at each stroke of the engine. In the discussion which followed some interesting facts regarding rotary engines and steam turbines were presented. Messrs. R. L. Newman, S. W. Hayes, A. M. Waitt, C. O. Arey and W. B. Cowles were elected to active membership, and Messrs. W. J. Walker, S. B. Sheldon, H. P. Fairfield and Wm. Secher to associate membership.

The Western Railway Club.

The club met on Tuesday, May 19, at 2 p. m., in the Auditorium Hotel. A discussion was had on the paper on "Locomotive Rating and Fuel," read at the April meeting by Mr. Tracy Lyan; and on the paper on "Railroad Ethics," presented at the April meeting by Mr. H. D. Judson.

Two papers were presented, one by Prof. W. F. M. Goss, of Purdue University, entitled "The Performance of the Purdue Locomotive 'Schenectady.'" The second, by D. L. Barnes, M. E., on electric motors, and entitled "The Relation of Speed to the Power and Efficiency of Direct Current Series Electric Motors for Locomotives." The annual election was held.

The following officers were elected at this meeting: President, A. M. Waitt; First Vice-President, F. A. Delano; Second Vice President, E. M. Herr; Treasurer, J. N. Barr; Member Executive Committee, P. H. Peck; Secretary, Walter D. Crosman.

Western Society of Engineers.

A regular meeting (the 344th) of the society was held in the society's rooms, May 6, First Vice-President Thos. T. Johnston in the chair. There were 37 members and guests present.

The Chairman of the Entertainment Committee stated that arrangements were being made for an excursion to South Chicago to visit the works of the Illinois Steel Co.

The Secretary announced the appointment, by President Wallace, of Messrs. Edgar Williams and John Ericson as a committee to act with the Illinois Society in the matter of sanitary legislation.

Owing to the small number visiting the society rooms in the evening it was decided to close them at 5:30 p. m. hereafter.

Then followed a paper on the subject of "Foundations," by Mr. George E. Thomas, which evoked considerable discussion. The paper and discussion will be printed in the June issue of the *Journal*.

The Traveling Engineers' Association.

A committee asks information from the members on the question, "What is the Best Incentive to Offer Enginemen to Decrease the Coal Consumption?"

1. Do you allow any premiums to enginemen for economy in the use of coal? What advantages and disadvantages do you find in this method?
2. Please give full account of computing the amount due, to whom paid, the average per month paid for highest efficiency, and the proportion of enginemen to whom premium is paid.
3. If you do not use the premium system, what method do you use to secure the most economical use of coal?
4. Is coal mileage per ton based on engine miles or car miles?
5. Do you allow mileage on way freight trains for switching and other work outside of the straight mileage made?
6. Where economy in fuel is given close attention is the same close attention given to the condition of boiler as to scale and mud, leaky flues, defective packing or valves and other defects? That is, should not an engine crew trying to make a good record be encouraged by keeping the engine in good shape for them to do this?
7. Do you consider it a cause for reprimand or discipline if one man makes a poor showing on coal economy with the same conditions under which another man will make a good showing?
8. Is a man's good record in this matter taken into account when he comes up for discipline as to moderating his sentence, and should it be a factor when considering promotion to more important runs?

Answers should be addressed to Mr. J. W. Sheldon, Renova, Pa.

The next meeting of the Association will be at Minneapolis, Minn., Sept. 8, 1896.

Association of American Railroad Accounting Officers.

The eighth annual meeting of this association will be held at the Murray Hill Hotel, New York City, on May 27, beginning at 10 a. m. The Secretary, Mr. C. G. Phillips, of Chicago, has issued a notice giving a list of all the things to be done at the convention, accompanied by some of the committee reports. There will be an address on "Railroad Clearing Houses," by S. C. Chapman; one on the "Treatment of Supply Accounts," by J. Carstensen, and one on "Passenger Train Checking," by Charlton Messick.

The Standing Freight Committee reports that it disapproves the proposition for each road, in rendering its accounts to other roads, to hold documents so as to send the whole for a single month in one package. No accounts should be delayed for such a purpose. The committee has been unable to agree upon a uniform blank for freight bills. On request of Mr. C. D. Bird (C., B. & Q.) the committee recommends that, on abstract blank, Form 104, the columns for car number and for initial be reversed, so as to agree with those columns on the standard way bill of the association. The form of way bill recommended by the National Association of Local Freight Agents is "given leave to withdraw," the committee believing that all blanks dealt with in the revenue department should be prepared by the accounting department. The committee recommends the general use, for interline way bills, of "jute manilla" or some other paper equally strong, and that copies of all documents pertaining to interline freight account settlements sent to other roads should be made on hard paper; but if tissue must be used, it should be white, so as to be more readily distinguishable from the yellow used for way billls.

The committee reports that 87 roads now use the standard way bill form of the association. Among these roads are the Atchison, Topeka & Santa Fe, Baltimore & Ohio, Central of New Jersey, Chicago, Burlington & Quincy and allied roads; Michigan Central, Oregon Railway & Navigation Co., Plant System, Union Pacific and Wabash. Many roads have given their reasons for not adopting the blank. The principal objection is the additional expense, the standard providing for many items not wanted by some roads. The space for junction stamps is most frequently mentioned as unnecessary. One road wants space for date of transfer, kind and length of car and reference to the division sheets; another wants columns for prepaid beyond, and for date of bills of lading for cotton; also a live stock stub, with provisions for charges for feeding in transit.

The Standing Passenger Committee recommends that where there are storage or transportation charges on baggage that is re-forwarded, the forwarding road should advance the same, payment to be made either in cash or through the general office on a certificate of the station baggageman; a form for the certificate is given. This committee makes recommendations concerning the reporting of inter-road tickets and of tickets issued in exchange for prepaid orders; also on inter-line ticket correction claims.

PERSONAL.

—Mr. W. Dale Harris has resigned the position of Managing Director of the Ottawa & Gatineau Valley road in Ontario.

—Mr. J. T. Odell, Vice-President of the New England, will resign July 1, in order to assume his duties as President of the new Butler & Pittsburgh road.

—Mr. George W. Blodgett, Electrical Engineer of the Boston & Albany, last week gave a lecture on Block Signaling, illustrated by lantern slides, at Cornell University.

—Mr. E. G. Adams, Engineer of the Bridge and Construction Department of the Pennsylvania Steel Co., has resigned to take a similar position with the Union Bridge Co., Athens, Pa.

—Mr. H. E. Farrel, who for some years has been Chief Clerk to the General Freight Agent of the St. Louis Southwestern, has been appointed General Freight Agent of that company, with headquarters in St. Louis.

—Mr. H. W. Matters, Purchasing Agent of the Louisville, Evansville & St. Louis, has resigned and Receiver G. T. Jarvis will hereafter perform the duties of the office. Four Division Roadmasters have also been retired.

—The former Northern Pacific receivers, Messrs. Thomas F. Oakes, Henry C. Payne and Henry C. Rouse, have been allowed a compensation of $81,000 each for their 2½ years' service as receivers of the Northern Pacific road. This allowance was made by Judge Jenkins, of the United States Court, last week.

—Mr. H. H. Filley, now City Engineer of Kansas City has resigned that office to return to Mexico as Chief Engineer of the Mexico, Cuernavaca & Pacific road. Mr. Filley has had a very wide experience in the location and construction of Mexican railroads and has been Chief Engineer of important railroads in that country.

—Mr. Henry C. Parker, Traffic Manager of the Lake Erie & Western road, was found dead in his room at the Denison House in Indianapolis, May 15, death having resulted from heart disease. He had been Traffic Manager of the Lake Erie & Western since 1887, and had previously held similar offices on other roads in Indiana and Ohio.

—Mr. A. S. Dunham, General Manager of the Ohio Southern road, has resigned. Mr. Dunham became General Manager of this road last October, when the present receiver succeeded Mr. George W. Saul. Mr. Dunham was for a number of years President and General Manager of the Seattle, Lake Shore & Eastern road in Washington State.

—Mr. J. H. Hill, formerly Secretary to Vice-President and General Manager Purdy of the Missouri, Kansas & Texas, has been appointed General Manager of the Galveston, Houston & Henderson, with headquarters at Galveston, Tex. This road is now operated jointly by the Missouri, Kansas & Texas and the International & Great Northern.

Mr. J. A. Atwood, who has been Engineer of Construction of the Pittsburgh & Lake Erie road, has been made Acting Chief Engineer, Mr. F. E. House, having resigned to become Chief Engineer of the new Butler & Pittsburgh road. Mr. Atwood has been with the Pittsburgh & Lake Erie since 1888, going to that road from the Lake Shore & Michigan Southern. Recently his title has been Principal Assistant Engineer.

—Mr. M. F. Bonzano has been appointed General Manager of the new Chattanooga Southern Railroad, and as such will have charge of all the departments of the company. Mr. Bonzano was recently on the South Jersey Road as Assistant General Manager and General Superintendent, resigning the latter office a few weeks ago. He was for many years on the Philadelphia & Reading as Division Superintendent and General Superintendent.

—Mr. E. D. Bronner, Master Car Builder of the Michigan Central, has been appointed Assistant Superintendent of Motive Power, a new office on this road, as was that of Superintendent of Motive Power, which was created a short time ago when Mr. Robert Miller, formerly General Superintendent, was placed in charge of the mechanical department of the company. Mr. Bronner has had charge of the car department of the Michigan Central for many years.

—Mr. Thomas L. Greene, the well-known writer on railroad topics, who for several years back has been an editorial writer on the New York *Evening Post*, is now auditor of the Manhattan Trust Company, 10 Wall street, New York City. Mr. Greene was formerly a traffic man, but he has lately devoted his attention chiefly to the financial and accounting departments of railroading, and it is his knowledge of these that led to his engagement with the Manhattan Trust Company.

—Mr. William J. Fransioli, private secretary of the late Col. F. K. Hain, Second Vice-President and General Manager of the Manhattan Railway, has been appointed General Manager ad interim. Mr. Fransioli has been connected with the road for 15 years, and his position in the manager's office has made him familiar with the details of operation of the road. His present appointment is made to facilitate the work of the office. Colonel Hain's successor may not be appointed for some time.

—Mr. William H. Schoen, of the Schoen Manufacturing Co., and a brother of the President of that company, died on May 18, aged 54 years. Mr. W. H. Schoen became connected with the Schoen Manufacturing Co. at the time of its organization and had remained with it up to his death. He was a quiet and unassuming man, but successful in business. He has been in railroad supply work since 1872, when he purchased the old Delaware Spring Works, at Wilmington, Del., one of the early concerns in this country to manufacture car and locomotive springs.

—Col. J. N. Schoonmaker, of Pittsburgh, has been elected Vice-President of the Pittsburgh & Lake Erie road, succeeding Mr. J. H. Reed, who recently resigned to become Chairman of the new Butler & Pittsburgh road. Colonel Schoonmaker was elected a director of the Lake Shore & Michigan Southern road at its last annual meeting. He is largely interested as a manufacturer in various industries about Pittsburgh, chiefly in the coal and coke companies, owning large tracts of such land on the line of the Pittsburgh, McKeesport & Youghiogheny branch of the Pittsburgh & Lake Erie.

—Mr. I. H. Burgoon, who has been appointed General Superintendent of the Ohio Southern, in charge of the operating department, is now General Superintendent of the Utah Central narrow gage line, but he is widely known in Indiana and Illinois, where most of his railroad experience has been. He has been Superintendent and General Manager of various roads in those states since 1868. For some time he was with the old Indiana, Bloomington & Western, then became Receiver and General Manager of the Bellaire, Zanesville & Cincinnati road, after which he was General Manager of the Terre Haute & Peoria road. When that road was leased to the Terre Haute & Indianapolis he remained as Superintendent of the division.

—Mr. C. Peter Clark, General Freight Agent of the Old Colony Division, on the New York, New Haven & Hartford, has been appointed Assistant General Manager of New England road. The appointment was made because of the probable frequent absences from Boston of Mr. J. T. Odell, the present General Manager of the company, during the next few months in connection with his new duties as President of the Butler & Pittsburgh road. Mr. Odell's resignation as Vice-President and General Manager of the New England takes effect on July 1. Mr. Clark has been for some time in the freight department of the New Haven, becoming General Freight Agent of the Old Colony Division about a year ago. He is a son of President Clark, of the New York, New Haven & Hartford.

—Mr. Edward B. Guthrie has been appointed Superintendent of the Bureau of Engineering of the City of Buffalo to succeed Mr. Samuel J. Fields. Mr. Guthrie served as an Assistant to the City Engineer of Buffalo from January, 1874, until 1879; then he was for several years in private practice and in January, 1885, returned to the Engineering Bureau of the city, and in the fall of 1886 became Deputy Engineer and has remained in that service until now. He is also senior member of the engineering firm of Guthrie & Rockwood. Mr Guthrie was born in 1849, graduated in 1871 from the Academical Department of Yale College and afterward from the Rensselaer Polytechnic Institute. He is a member of the American Society of Civil Engineers, of the American Society of Mechanical Engineers and of several clubs. He is not only a man of high professional standing, but of most estimable character.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio.—Thomas Trezise, Master Mechanic, has been transferred from the Philadelphia Division to the Pittsburgh Division, with headquarters at Pittsburgh; E. T. White, heretofore General Foreman of engines of the Philadelphia Division, succeeds Mr. Trezise as Master Mechanic of the division with headquarters in Philadelphia.

Butler & Pittsburgh.—F. E. House, Chief Engineer of the Pittsburgh & Lake Erie, has been appointed Chief Engineer of this new road.

Chattanooga Southern.—The new company took possession of the railway and property heretofore in the control, and operated by, General Joseph W. Burke, as Receiver of the Chattanooga Southern Railway, on May 11. M. F. Bonzano has been appointed General Manager in charge of all departments with offices at Chattanooga, Tenn.

Chicago, Burlington & Quincy.—The annual meeting of the stockholders was held at the general offices in Chicago, on May 13, 483,241 shares being represented. The old Board of Directors was re-elected, excepting that Robert Treat Paine, second, of Boston, was substituted for Charles J. Paine, of Boston, who is in Europe.

Chicago, Milwaukee & St. Paul.—George T. Foote, Local Passenger Agent of the road at Kansas City, has been appointed District Passenger Agent in southeastern Missouri, Kansas, Oklahoma and the Indian Territory.

Delaware & Hudson.—At a meeting of the stockholders of the company, held at the office of the company, in New York City, May 12, the following were elected managers: James Roosevelt, Robert M. Olyphant, Wm. H. Tillinghast, Alfred A. Vansantvoord, James A. Roosevelt, Alexander E. Orr, Cornelius Vanderbilt, Chauncey M. Depew, James W. Alexander, James R Taylor, Benjamin Brewster, Horace G. Young, John Jacob Astor. At a meeting of the Board of Managers, held May 13, Mr. Robert M. Olyphant was unanimously elected President.

Fernandina Western.—The annual meeting of the stockholders of this new company was held at Fernandina, Fla., May 13. N. B. Borden was elected President; Patrick Kelly, Vice-President; F. W. Hoyt, Treasurer; James McGiffin, General Manager; E. W. Bailey, Secretary.

Galveston, Houston & Henderson.—J. H. Hill has been appointed manager for this company with headquarters at Galveston, Tex.

Gulf & Interstate.—The stockholders elected the following officers at Galveston, Tex., last week: J. W. Riddell, C. L. Wallis, I. H. Kempner, C. C. Adams, Leon Blum, Fox Winnie, L. P. Featherstone, E. McCarthy and N. Weekes.

The directors have elected the following officers: Nicholas Weekes, President; Leon Blum, Vice-President; Fox Winnie, General Manager; L. P. Featherstone, Secretary; E. McCarthy, Treasurer, all of Galveston, Tex.

Ohio River.—At the annual meeting of the stockholders, held in Parkersburg, W. Va., on Thursday of last week, the following board of directors was elected: H. H. Rogers, A. C. Bedford, C. M. Pratt and C. M. Harkness, of New York; S. W. Cotton, Jr., of Philadelphia; J. N. Camden, George A. Burt and B. D. Spillman, of Parkersburg, W. Va.; Eli Ensign, of Huntington, W. Va. A president, to succeed Col. W. P. Thompson, deceased, will be selected at a meeting of the directors, to be held in New York at a date to be announced later.

Ohio Southern.—A. S. Dunham, having resigned as General Manager, I. H. Burgoor has been appointed General Superintendent. Among other changes are the appointments of Mr. C. A. Barnard, as Assistant General Freight Agent, and Mr. F. E. Fisher, as Assistant General Passenger Agent, vice Mr. L. R. Brockenbrough, General Freight and Passenger Agent, resigned; and C. A. Chambers, Traveling Freight Agent, with headquarters at 435 Walnut street, Cincinnati, O.

St. Louis, Chicago & St. Paul.—H. L. Harford having resigned as Cashier and Car Accountant, effective May 15, those offices have been abolished. Ralph Blaisdell, Auditor, will assume the duties heretofore performed by the cashier. D. C. Frederick, Car Service Agent, will assume the duties heretofore performed by the Car Accountant, both with offices at Springfield, Ill.

Texas Midland.—At the annual meeting of the stockholders at Terrell, Tex., on May 12, the following directors were elected: E. H. R. Green, Terrell; Captain M. B. Lloyd, Fort Worth; E. H. Green, Wm. Quinlan, New York; J. S. Lockwood, San Antonio; T. W. Houston. E. H. R. Green was elected President and Captain Lloyd Vice-President.

West Jersey & Sea Shore.—At a meeting of the Board of Directors of the road last week George B. Roberts was chosen President; W. J. Sewell, First Vice-President; Charles E. Pugh, Second Vice-President, and Samuel Rea, Third Vice-President.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Cleveland, Cincinnati, Chicago & St. Louis. It is reported that the company will connect Richmond, Ind., with Greenville, O., and that the surveying will commence in a few weeks. It is claimed that much of the right-of-way has been secured,

Duluth & Great Northwestern.—A company has been organized at Duluth to build a road from Duluth to the Missouri River, in North Dakota, through the wheat country in Northern Minnesota and Dakota. George H. Mansfield, of Greenfield, N. H., representing Eastern capitalists, is President; Caleb S. Cox, Hubbard, Minn., Vice-President; Isaiah H. Bradford, Hubbard, Treasurer; John A. Keyes, Hubbard, Secretary and Treasurer, and they, together with Edward H. Spalding, of Duluth, Minn., are the first Board of Directors.

Elgin, Joliet & Eastern.—Engineers are surveying at Hammond, Ind., for the extension of the Western Indiana road, recently purchased by the company, from East Chicago. The extensions provided for are east from the Corning steel plant along the north bank of the Grand Calumet River to Clark Station, and from East Chicago along the old canal north to Whiting. Col. R. D. Walsh, of East Chicago, has the contract for grading the two extensions.

Galveston, La Porte & Northern.—This road was opened from Houston to Galveston, and regular service inaugurated on May 12. This is the fourth road between Houston and Galveston. The new line is formed by a consolidation of the Houston Belt and Magnolia, the La Porte, Houston & Northern, and the North Galveston, Houston & Kansas City. The road is at present in the hands of Receivers M. T. Jones and T. W. House. The line is 55 miles long, and has been building about three years. Part of the line out of Houston has been in operation. The erection of the bridge over Galveston Bay, and other bridge work has delayed the opening of the road to that point.

Greenwood, Anderson & Western.—The subcontracts for grading on the Greenwood extension of this road, more familiarly known as the Carolina Midland, are now being let by W. B. Strang & Co., of 15 Wall street, New York City. The extension is to be 66 miles long, extending from Seivern to Batesburg and Greenwood, connecting with the Seaboard Air Line and the Southern, and thus securing connections to Atlanta and Western points. Watkins & Hardway, of Birmingham, Ala., have secured the first sub-contract for grading beyond Seivern. The construction work is to bgin at once.

Kansas City, Pittsburgh & Gulf.—Tracklaying on the extension south of Shreveport, La., has been begun, and the rails will be laid at the rate of two miles daily until Wallace Lake, 13 miles below Shreveport, is reached. Here tracklaying will be suspended until the long bridge across the lake is completed. Grading south of the lake to Mansfield will be continued, and the rails can be laid on this section if the bridge work is delayed. Trains will probably be run into Mansfield by July 4. Mr. Knoble, the Chief Engineer of this division of the road, repeats the assurances of other officers that through trains will be running to Sabine Pass, on the Texas coast, before January next. The locating engineers have finished the location of the line to Sabine River, and a locating party is now between Sabine River and Beaumont, Tex. The distance between the crossing of the Sabine and Beaumont is about 40 miles, if the upper crossing is adopted, and if the lower crossing is adopted. 30 miles. The 20 miles between Beaumont and Port Arthur, on the Gulf, are already completed and trains running. North of Texarkana there is a gap between Horatio, Ark., and the present southern terminus from the Kansas City end of the line of 63 miles, and the work of closing the gap, Mr. Knoble believes, can be accomplished within six months, notwithstanding the heavy character of the work.

Kings County Elevated.—Justice Gaynor, of the Supreme Court in Brooklyn, has denied the application for an injunction to restrain the Brooklyn & Brighton Beach and Kings County Elevated roads companies from connecting the roads by an elevated spur in Franklin avenue and Lefferts place, Brooklyn. When the connection shall be completed there will be another direct line to Coney Island from the New York & Brooklyn Bridge and New York ferries.

Lake Superior & Ishpeming.—Rails are being laid on this new line in the Northern Peninsula of Michigan between Ishpeming and Marquette. The work on the ore dock at Presque Isle, north of Marquette, is being pushed, and the first ore over the new line will probably be forwarded shortly after July 1.

Pennsylvania.—Among the new lines which are likely to be undertaken this year is the line from the Cumberland Valley road to the Bedford branch, a distance of from 30 to 40 miles, according to the point where the new line branches off from the Cumberland Valley road. Plans were prepared for this line about two years ago, but nothing is to be done in regard to its construction until the business greatly increases. The building of this line will relieve the main line. This road will be built on the line of the old South Pennsylvania.

Plans have been prepared by the engineering department for considerable new construction work, which will be undertaken, if there is any continued improvement in earnings. These plans include quite a large number of short branches, many of them to bituminous and anthracite coal mines in Pennsylvania.

Richmond, Fredericksburg & Potomac.—The contract for building a branch from the station at Fredericksburg, Va., to the John G. Hurkamp Extract Works has been awarded to H. H. George, Jr.

Electric Railroad Construction.

Alexandria, Va.—It is proposed to build an electric railroad from Alexandria City to near West Washington. F. S. Corbett, County Supervisor, may be addressed for further information.

Baltimore, Md.—The Falls Road Electric Railway Co. propose to build a line starting at Maryland and Lafayette avenues, pass through Mount Washington, thence to Park Height Avenue, where connections will be made with the Pipesville line of the Traction Co. The road is to be seven miles long and the estimated cost is $400,000. Among the directors are Wallace King, Geo. R. Webb and J. R. Pitcher.

The City Council has granted the franchises for constructing new electric roads in East and Northeast Baltimore to the Central Railway Co. Work is to begin before July 1, and to be completed by Jan. 1 next.

Contracts were closed on May 15 with the Westinghouse Electric Co. to furnish motors for the car equipment of the Columbia & Maryland Railway Co., the boulevard road, which is to connect Baltimore and Washington.

Belleville, Ont.—The Belleville Traction Co. will extend its road eight miles. T. C. Lazier, Superin-

tendent, is ready to receive bids for the motors and other equipment.

Bradford, Pa.—The Pierce Construction Co. has been given the contract for building the Bradford Electric Street Railroad. Work was begun last week.

Buffalo, N. Y.—Governor Morton has signed the bill confirming the franchise for the Buffalo Traction Co. to build 30 miles of tracks in the city. On May 15, the stockholders elected the following officers: Edwin G. Miller, President; H. P. Bisell, Secretary; J. B. Mayer, Treasurer. Among the directors elected were W. S. Bissell, T. L. Johnson and J. Lang.

Chattanooga, Tenn.—The Lookout Mountain Incline Railway Co. will expend about $4,000 in enlarging its plant.

Chicago, Ill.—It is proposed to build an electric road from Chicago to Joliet, a distance of 40 miles, connecting the various towns along the drainage canal. The overhead trolley is to be used, and the cost is estimated at $800,000.

Clayton, Mo.—A company has been formed by Ernest P. Bell and others to build an electric road from the suburbs of St. Louis to Clayton, a distance of about five miles.

Cleveland, O.—The Lorain & Cleveland Electric Railway Co. has obtained a franchise for the right of way through Dover township, a distance of about a mile and a half. The cars will run for most of the distance over private property.

Columbia, S. C.—The Columbia & Eau Claire Electric Railway Co., has applied for a charter for an electric railroad in Columbia. The capital stock is $50,000, and the incorporators are W. A. Clark, Charles W. McCreery, F. H. Hyatt and J. S. Muller.

Hamilton, Ont.—The Hamilton Radial Railway has been granted by the council a 32-year franchise, to extend its road through Hamilton. M. W. Hopkins has been appointed Chief Engineer.

Hammond, Ill.—The Hammond, Whiting & East Chicago Electric Co. has completed its double track road to Roby. The line was opened for public use on May 16.

Hollister, Mass.—The Milford, Holliston & Framingham Street Railway, extending from South Framington to Milford via Holliston Centre, was opened on May 11. The road is 12 miles long and has cost $175,000. George B. Larabee, of Boston, is General Manager, and Charles E. Barnes, of Plymouth, is one of the directors.

Kansas City, Mo.—The St. Louis & Denver Leffler Electro-Magnetic Railroad Co. has been incorporated by F. J. Patterson, L. T. Sunderland and J. F. Shotts, with a capital stock of $5,000,000.

Meadville, Pa.—The contract for the erection of a power plant by the Meadville Street Railway Co. has been given to A. L. Johnson, 1112 East Main street, Richmond, Va.

Nantasket, Mass.—It is reported that the Nantasket Beach Electric Railway Co. will extend its electric equipment to Hingham within the next few weeks.

Oakland, Cal.—The Laundry Farm Railroad will be transformed into an electric line. The poles are all set and the work of running of wires has begun.

Oswego Falls, N. Y.—The Fulton & Oswego Falls Street Railway Co. has been granted the right to lay tracks in Oswego Falls.

Pittsburgh, Pa.—The new Carnegie electric road from Pittsburgh to Crafton and Ingram was opened May 11.

Rahway, N. J.—The Union & Middlesex Traction Co., of this city, has awarded the contract for finishing its road through Woodbridge and Boynton Beach. The length of the road will be 7½ miles, two miles of which have been in operation over a year.

Scranton, Pa.—The Lackawanna Valley Traction Co. has begun the construction of an electric road between Dunmore and Winton. At Dunmore the new line will connect with the lines running into Scranton.

Sistersville, W. Va.—McGhie & More, of Sistersville, have completed surveys for an electric railroad to extend from Sistersville to Mannington, W. Va., a distance of nearly 50 miles. The road is to be used chiefly for carrying oil. During last winter as much as $50 a ton for transporting freight five miles was paid by the oil men.

Syracuse, N. Y.—The Council has granted a franchise to the Suburban Co. (embodying all the Mayor's suggestions), and one to the Lakeside Co. A large majority of the citizens are opposed to granting the Suburban franchise.

Philadelphia.—The Fairmount Park Transportation Co. has awarded the following contracts for the construction of the Fairmount Park electric road:

Grading and stone work to Charles A. Porter; cars and trucks to the J. G. Brill Co.; rails to the South Bethlehem Iron Co.; track laying to William Wharton, Jr. & Co., of Chester, and the electrical equipment to the General Electric Co. The power station will have a capacity of eight boilers of 250 H. P. each, which will supply steam to three 750 H. P. engines of the Wetherill-Corliss tandem, compound-condensing type. Electric brakes will be placed on all the cars by the General Electric Co., but the cars will also be equipped with hand brakes for emergencies.

Uhrichsville, O.—The Cleveland Construction Co. has been awarded the contract for building the Uhrichsville & New Philadelphia electric road, and will begin work soon. The capital stock is $150,000.

Uniontown, Pa.—The Uniontown Electric Railway Co. will extend its road to the Brownfield Coke Works. The extension will be about three miles long, and will cost about $23,000. The route is being surveyed, and the line will probably be built this summer.

GENERAL RAILROAD NEWS.

Baltimore & Lehigh.—It is reported that negotiations have been begun for the consolidation of the Baltimore & Lehigh road, and the York Southern, the lines when united to be operated by the Pennsylvania. It is stated that a definite proposition has been submitted to the Baltimore & Lehigh by the Pennsylvania. If the agreement is reached, the Baltimore & Lehigh will be converted into a standard gage road. This and other improvements would necessitate an issue of $800,000 bonds by the new consolidated company. The new road, if secured by the Pennsylvania Company, would be valuable to the Northern Central road. The Baltimore & Lehigh and York Southern together form a route from Baltimore to York, Pa., 75 miles, and the two divisions were formerly operated as one line, narrow gage. The York Southern, the Pennsylvania Division, is now standard gage.

Baltimore & Ohio.—The receivers of the company have applied to the United States Court for authority to issue $3,400,000 six per cent. car trust certificates. One-half of the amount will be allotted to the Mercantile Trust and Deposit Company of Baltimore, and the other half to the Mercantile Trust Company of New York. The proceeds of the sale of the securities will be used in paying for the new equipment purchased by the company. The court will also be asked to authorize the issue of $5,000,000 of receivers' certificates.

Chicago, Peoria & St. Louis.—The following statement shows the earnings and expenses for the first four months of this year:

1896.	Earnings.	Expenses.	Net Earnings.	Taxes & Rentals.	Net Income.
January....	$86,169	$55,513	$30,655	$6,765	$23,890
February...	82,334	52,268	30,067	6,501	22,566
March.....	84,001	53,026	30,975	6,501	24,474
April.....	75,426	56,300	19,126	6,501	12,625
Total.....	$327,930	$217,087	$110,823	$26,268	$84,555

Duluth & Winnipeg.—Notice has been given of an indefinite postponement of the sale of the road pending an appeal of the case recently decided by United States Judge Nelson at St. Paul, Minn. The opposition to the present sale is by Foley Bros. & Guthrie, contractors, of St. Paul, who built a good portion of the road, and whose claim is not secured in the present decree. The Attorney-General of Minnesota also opposes the sale.

Meriden, Waterbury & Connecticut River.—This road was sold at Hartford, Conn., on May 18 to A. Heaton Robertson, of New Haven, for $100,000, under a decree of foreclosure granted to the trustees for the mortgage bondholders. The bond issue is $400,000, owned by the New England Railroad Company, which purchased the bonds some time ago.

New York & Putnam.—The attempt of certain minority stockholders to have the purchase of the stock and other securities of this company by the New York Central a year or more ago declared illegal has failed, Judge Townsend, of the United States Circuit Court, having last week decided that all the proceedings leading to the purchase of the securities of the company, and its control and operation by the New York Central, were legal. The plaintiff in the suit held about 275 shares of the common stock of the old New York & Northern, and contended that a majority of the bondholders had permitted an unnecessary default in the payment of interest; that the directors also acted with these bondholders and carried through a reorganization by foreclosure without regard to the rights of the stockholders, enabling the New York Central to secure the property at an inadequate price.

New York, New Haven & Hartford.—The earnings for the quarter ended March 31 show a balance above charges of $743,907, an increase of $240,277 over last year. The comparative exhibit for the quarter and nine months follows:

Three months, to March 31:	1896.	1895.	Inc.
Gross earn.....	$6,606,955	$6,156,832	$450,123
Net earn.....	2,118,091	1,781,652	336,439
Total income.....	$2,242,114	$1,829,561	$412,553
Fixed charges.....	1,458 267	1,425,531	72,.76
Balance.....	$713,907	$403,630	$340,277
Since July 1:			
Gross earn.....	$32,736,641	$30,536,512	$2,200,132
Fixed charges.....	4,897,4.9	4,202,587	195,032
Balance	$2,66 ,431	$2,730,528	Dec. $95,097

Ohio River.—The annual report gives the gross earnings last year as $887,270, an increase of $174,831, or 25.54 per cent. Operating expenses were $567,724, an increase of $132,259, or 30.57 per cent. Net earnings were $319,548, an increase of $42,580, or 15.37 per cent. Other details of operations are as follows: Gross earnings, per mile, $3,968.57; increase over last year, $728, or 24.54 per cent. Operating expenses per mile, $2,539.26; increase over last year, $591.50, or 30.28 per cent. Gross earnings from passengers, $342,251; increase over last year, $45,590, or 14.60 per cent. Gross earnings from freight traffic, $469,536; increase over last year, $136,963, or 38.07 per cent. Aside from ordinary maintenance of way, $18,770 was spent in filling in trestles and rebuilding old ones. During the year $100,000 bonds were disposed of, as were $76,000 of the bonds of the Huntington & Big Sandy. The funds thus secured were used to cancel floating debts, discharging old car trust obligations, and buying new equipment. The interest charges for the coming year will be: Ohio River road, interest on bonds, $234,000; Huntington & Big Sandy bonds, $14,640: total, $249,540

Pittsburgh, Cincinnati, Chicago & St. Louis.—An issue of $5,000,000 four per cent. consolidated mortgage gold bonds at 102 and accrued interest was offered for public subscription in New York, London and Frankfort last week, and was over-subscribed. This is an additional issue of bonds of this company, of which $28,000,000 are now listed, the greater part of it being at 4½ per cent. interest.

San Antonio & Gulf Shore.—Henry Terrell, Receiver of this road, announces that the sale of the property has been fixed for July 7 next at San Antonio, Tex. The property to be sold includes a graded roadbed for about 30 miles southeast of San Antonio on which the track has been laid for a few miles, various rights of way, and a small amount of equipment.

Seattle, Lake Shore & Eastern.—This road was sold under foreclosure at Seattle, Wash., on Saturday of last week, and was bought in by the Reorganization Committee for $1,000,000. The efforts of the Northern Pacific to have the sale postponed was unsuccessful.

Union Pacific.—The earnings of the Oregon Short Line, and of the Union Pacific proper, for March, are given below:

UNION PACIFIC PROPER.

	1896.	1895.	1894.
Gross earn.....	$1,071,907	$1,075,573	$1,078,896
Oper. exp.....	671,293	682,290	822,615
Net earn.....	$400,614	$393,283	$256,281
P. c. exp. to earn.....	62⅝	63½	76¾
Net earn. 3 months.....	928,96b	985,716	833,566

OREGON SHORT LINE & UTAH NORTHERN.

Gross earn.....	$409,162	$351,853	$390,892
Oper. exp.....	194,519	222,164	274,585
Net earn.....	$214,643	$132,669	$116,307
Net earn. 3 months.....	538,131	269,069	332,920

Western Indiana.—The Elgin, Joliet & Eastern road has bought the Western Indiana road. It is in no way connected with the Chicago & Western Indiana, but is a three-mile road from the Indiana state line to East Chicago. The road was, in fact, built chiefly to furnish a convenient outlet for the freight originating at the numerous industries located along its route.

Electric Railroad News.

Baltimore, Md.—The Traction Co. directors on May 14 ratified a perpetual agreement for the company to operate the South Shore Electric Co.

New Castle, Pa.—A syndicate headed by Richard R. Quay and Senator Kennedy, of Pittsburgh, has purchased the local electric railroad, which is about 3½ miles long.

Toledo, O.—The Central Wisconsin Electric Railway Co. has gone into the hands of a receiver. The line included an inter-urban road to Neenah, Menasha, Appleton and Kaukadna.

TRAFFIC.

Traffic Notes.

The Acting Secretary of Agriculture at Washington has issued a general order to the inspectors of that department to watch the railroads and see if they take good care of livestock in transit.

Homer A. Judd, arrested for giving false weights on freight, at Kansas City, has pleaded guilty, and, on one of the four counts against him, has been sentenced to pay a fine of $350. The penalty on the other counts will be imposed at a subsequent term of the court.

The Long Island Railroad Company will run a special train for horses and carriages from Long Island City to Amagansett, Sag Harbor and other stations on the Montauk Division of the road, beginning Tuesday, May 26, and every Friday and Tuesday thereafter until July 1.

The Supreme Court of Illinois has dismissed a petition presented by a ticket broker of Chicago asking to have expunged from the record the opinion of this court, delivered a year ago, sustaining the law of Illinois prohibiting brokerage in tickets. The court holds that a person not a direct party to a decision has no right to present a petition like that under consideration. The claim of the Chicago broker was based on the allegation that the case in which the decision was rendered was a fictitious one.

Chicago Traffic Matters.

CHICAGO, May 20, 1896.

The demoralization that has existed in Western freight rates for the past two months has come to a head; at least there are two sizeable clouds in the sky. The diversion of grain to the gulf ports and the competition of the Lake Michigan Car Ferry are what make the trouble. The Car Ferry has always claimed a differential below the all-rail lines, but its demand has been denied. Now, to partially meet the competition of the Lake Michigan and Lake Superior line (boats running via Sault Ste. Marie) the Car Ferry has announced a tariff from Chicago to St. Paul 5 cents below the all-rail rates (first-class) and 5 cents above the all-water lines. In addition to this, the Car Ferry has leased large warehouses along the Chicago River, and established a lighterage service for all classes of freight. To meet these moves the Chicago Great Western announces reduced rates based on 55 cents (first class) between Chicago and St. Paul, 5 cents below the agreed all-rail rates. The Car Ferry company follows with a tariff based on 50 cents first class, and now the L. M. & L. S. boats announce 45 cents (first-class). The Chicago Great Western says it will meet the ferry rates, but there will be a conference this week which may calm the troubled waters. The Chicago Great Western has made a 50 per cent. reduction in local grain rates from Iowa, Minnesota and Missouri to Chicago. This move is said to have been made to meet the cut rates that are being quoted from that territory to the Gulf and the low through lake and rail rates to the East recently put in effect from Iowa by the Burlington, the St. Paul and the Rock Island. The latter rates are, however, likely to be withdrawn, and that may appease the Chicago Great Western.

The action of the Pennsylvania in abolishing the baggage charge on bicycles west of Pittsburgh is not viewed with alarm by the roads west of Chicago, which are strictly adhering to their bicycle agreement. The Pennsylvania's action was brought about by the Ohio state law and by the competition of the roads between Chicago and the Ohio River that make no charge, particularly the Monon, which is making a bid for the L. A. W. business to the Louisville meeting. All the eastbound roads out of Chicago will probably abolish the charge. The wheelmen are little interested in the abolition of the charge on through business; their efforts are all directed against the suburban lines, and it will be no surprise to see at least two Western roads out of this city waive the charge within a very short time. At present the following Chicago roads make no bicycle charges: Illinois Central, Monon, Chicago & Eastern Illinois and Chicago & Northern Pacific (an exclusively suburban line).

The Rock Island has been granted authority by the Chairman of the Western Passenger Association to meet the competition of the Chicago Great Western, and other lines, in accepting second-class tickets in first-class sleeping cars.

The total eastbound shipments by lake last week amounted to 48,013 tons. Total shipments by rail (except live stock) to the East last week amounted to 50,794 tons, compared with 64,446 tons for the preceding week, a decrease of 13,652 tons, and against 40,323 tons for the corresponding week last year. The productions of the all-rail shipments carried by each road were:

Roads.	Week to May 16.		Week to May 9.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central.....	3.675	7.2	5,389	8.4
Wabash.....	4.943	9.7	6,439	1.0
Lake Shore & Mich. South.	7,363	14.5	8,646	13.4
Pitts., Ft. Wayne & Chicago	6,512	12.8	7,612	11.8
Pitts., Cin., Chi. & St. Louis.	6,905	13.6	6,947	10.8
Baltimore & Ohio	4,688	9 2	5,610	8.7
Chicago & Grand Trunk....	4,948	9.8	6 337	9.8
New York, Chic. & St. Louis	4,113	8.7	6,222	9.6
Erie.....	4,898	9.7	8,100	12.6
C., C., C. & St. Louis.....	2,451	4.8	3,144	4.9
Totals.....	50,794	100.0	64,446	100.0

Of the above shipments 1,723 tons were flour, 19,810 tons grain and millstuff, 9,753 tons provisions, 8,699 tons dressed beef, 2,257 tons butter, 1,420 tons hides, and 4,730 tons lumber.